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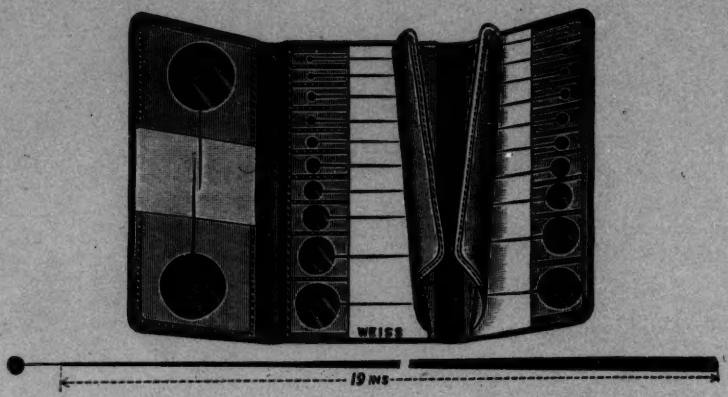

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JUNE, 1917

COMMUNICATIONS

BITEMPORAL HEMIOPIA: THE LATER STAGES AND THE SPECIAL FEATURES OF THE SCOTOMA

With an examination of current theories of the mechanism of production of the field defects

(*Concluded from p.* 294)

BY

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Local Intoxication

In order to explain the scotomatous or neuritic type of field it was suggested by Fuchs[21] in 1895 that toxins, present in the inflammatory œdema surrounding an actively growing tumour, acted upon the papillo-macular bundle in the chiasma. Then in connection with cases of post-nasal sinus disease, toxins are commonly believed to be the cause of the frequently associated retrobulbar neuritis, and it seems reasonable to expect that, when bitemporal hemiopia occurs in these cases, it should be produced in the same way. There is a great clinical resemblance between the field changes in retrobulbar neuritis and in scotomatous cases of bitemporal hemiopia, especially the markedly scotomatous type, of which Case III is a good example. In both conditions central defects are very prominent, while peripheral changes are usually relatively slight, and comparatively rapid variations in the size, shape, and the intensity of the scotoma are common. It seems

very probable that chiasmal or tract hemiopic or quadrantic scotomata are due to the same kind of cause as operates in many cases of retrobulbar neuritis, and, as a preliminary to examining this question as it affects the chiasma, we may shortly refer to what is known of the causation of this more familiar but equally little understood condition.

A discussion of the ætiology of retrobulbar neuritis will be found in the writings of Wilbrand and Saenger,[64] Onodi,[38] Birch-Hirschfeld,[4] Schieck,[40] Augstein,[1] Langenbeck,[35] and others. Wilbrand and Saenger state explicitly that a central scotoma is always a sign of a *neuritic* lesion of the optic nerve path (the italics are the present writer's), and Schieck points out that retrobulbar neuritis is never primary but always dependent on some other morbid process. The cases which occur in connection with post-nasal sinus disease and with orbital tumours are of most interest in the present instance, because, as we have seen, sinus disease as well as hypophyseal tumours may cause bitemporal hemiopia.

In regard to the former variety, little or nothing is really known as to its cause, though, at the same time, the theory that the action of toxins derived from the inflamed sinuses is responsible is widely accepted. These cases are fairly common and frequently improve rapidly on opening up the sinuses, according to some writers, even if no septic condition is found. The anatomical conditions favouring this form of retrobulbar neuritis have been discussed by Onodi in his well-known book. According to Fuchs[20], the neuritis is caused by a direct extension of the inflammation to the orbital contents. Others, such as Wallis[61 62], favour a soakage of the toxins through the tissues. Wallis also observed that acute sinusitis is associated with central scotoma and chronic sinusitis with peripheral contraction of the fields. It is evident that the toxins do not act by way of the blood stream, as in this case retrobulbar neuritis would be a common accompaniment of bacterial infections of distant parts. It has been suggested that lymphatic pressure may be set up in the interior of the nerve, but, as already pointed out, this alone would not cause central scotoma. According to Groenouw[25], disease of the papillo-macular bundle alone does not arise through general compression of the optic nerve. Only in the intracanalicular portion of the nerve is pressure likely to develop, and the ring-scotoma which has been supposed to be specially characteristic of compression at this part occurs, as we have seen, in chiasmal lesions also, where the anatomical conditions are quite different.

It is well-known that orbital tumours may give rise to optic neuritis with central scotoma, but the mechanism of production of the nerve affection has received little attention. Birch-Hirschfeld,[4]

who is a convinced adherent of the toxic origin of retrobulbar neuritis, in his well-known paper describes a case of sphenoidal carcinoma which had broken through into the orbit and produced obstruction of the central vein of the retina. Optic neuritis and central scotoma were present, and a lesion was found in the papillo-macular bundle close behind the point of exit of the central vein. Farther backwards, where the tumour came in contact with the nerve, the conditions were normal. The microscopic characters of the lesion were similar to those found in monkeys after experimental poisoning with methyl alcohol. He suggests that the toxins are abnormal metabolic products of the tumour growth, and reach the nerve fibres along the obstructed vein. Onodi also refers to sphenoidal tumour with central scotoma, but without giving details. As Birch-Hirschfeld points out, venous congestion and œdema of the nerve cannot be the cause, as otherwise central scotoma would be a common feature of other conditions in which the nerve is affected in this way; and he believes that, in his case, it is justifiable to assume the chemical action of toxins. The same objection applies to the explanation advanced by Schieck: that the œdema interferes with proper nutrition of the nerve fibres, and, by preventing the removal, causes the accumulation, of normal toxic products of metabolism.

Through the kindness of Dr. Sym, I have recently seen a case in some ways closely resembling that of Birch-Hirschfeld. A tumour of five years' duration was present at the inner side of the right orbit of a woman of 35 years. The eye was displaced outwards and forwards, so as to be almost outside the orbit. Movement was extremely good except inwards, where it was somewhat restricted. About a year ago sight had begun to fail. There was marked optic neuritis, with great congestion of the retinal veins. Vision: fingers at 1.5 metres. The field showed enlargement of the blind spot and a central scotoma of about 5°, but was otherwise practically normal. The left eye was normal and healthy. A provisional diagnosis was made of obstruction to the central vein behind its exit from the nerve. The mobility of the eye seemed to indicate that the optic nerve was not greatly, or, at least, not tightly, stretched. An encapsuled soft tumour, about as large as a very big walnut, was removed. It was found to be in contact with the optic nerve behind the eye. Unfortunately, the result of the operation was not such as to enable any conclusions to be drawn. The eye became totally blind with subsidence of the neuritis, very small arteries, and pallor of the disc. The central artery of the retina was probably damaged at the operation.

Whatever the cause may be, it is evident that orbital tumours can cause retrobulbar neuritis, and Dr. Sym's case is interesting in so far as the tumour was purely orbital and encapsuled.

With regard to neuritis of the intracranial, as distinct from the orbital, portion of the optic nerve, we have little information. The observations of Foster Kennedy[31] show that tumours and abscesses of the frontal lobes may sometimes produce symptoms of retrobulbar neuritis on the ipso-lateral side, with the ordinary papilloedema with good vision, characteristic of increased intracranial pressure on the contra-lateral side. He suggests that this neuritis, with central scotoma, is the result of mechanical pressure on the intracranial portion of the nerve, the macular fibres suffering on account of more fragile structure in spite of their being surrounded by grosser strands, which retain their function, although more immediately subjected to the pressure. Kennedy's cases seem to favour a purely mechanical origin of retrobulbar neuritis, although this is opposed to Groenouw's view.

If we now apply our knowledge of retrobulbar neuritis, scanty though it be, to the study of chiasmal scotomata, it becomes evident that it is unnecessary to confine ourselves to theories of causation based solely upon the mechanical action of tumours. These scotomata indicate a neuritic process, and the condition we are dealing with is, as was suggested in my previous paper, a chiasmal retrobulbar neuritis, which may be produced by many causes, of which the proximity of a tumour constitutes only one. Rönne[22, 43] who is, as far as I am aware, the only other observer who has described this form of scotoma, attributes it to disseminated sclerosis or retrobulbar neuritis of the chiasma. An interesting and illustrative case is reported by Augstein. In a man of 38 years rapid loss of vision occurred in the left eye following severe left-sided headaches. When seen, the left field was reduced to the *upper-inner* quadrant only, while the vision and field of the right eye were normal. The sphenoidal cells were opened but found healthy. Although the Wassermann was negative, antisyphilitic remedies were actively employed, but without success. All perception of light was lost in the left eye, and a central scotoma, together with peripheral, mainly temporal, constriction appeared in the right field. After seven weeks, pallor of the temporal side of the left disc was observed. It was thought that a basal lesion in front of the chiasma might be present, possibly a rapidly growing sarcoma of the dura. The case was seen by Uhthoff and a diagnosis of retrobulbar neuritis, independent of syphilis, and with favourable prognosis, was arrived at. Recovery of vision ultimately took place. Augstein is a strong supporter of the toxic origin of the condition, and believes that some form of auto-intoxication was the causal agent. His case is quite a characteristic example of chiasmal retrobulbar neuritis, and the fields were of the same type as occurs in association with hypophyseal tumours; unfortunately the scotoma in the right field was not minutely analysed. It is certain, in my opinion, that if more exact

methods of perimetry were in general use, such cases would be more frequently detected.

We have considered the suggestions which have been offered as to the way in which the optic nerves become affected in cases of sinusitis or orbital tumour. The problem in regard to the chiasma, which is practically surrounded by cerebro-spinal fluid, and nowhere in contact with the dura mater, is much more difficult, and our ignorance is correspondingly greater.

Venous congestion *alone* may be rejected; it is doubtful whether it occurs to any great extent even in tumour cases.

By direct extension the inflammation might possibly be conducted from the dura over the olivary eminence, along the pia mater, which lies between the two optic nerves, to that which invests the lower surface of the chiasma and infundibulum. Were it to spread along the optic nerve sheaths, one would expect the nerves to be affected before the chiasma was reached, with consequent masking of the clinical picture. Where the chiasma is exceptionally far forwards, so that it lies over the olivary eminence, it might conceivably become affected by direct extension from a subdural focus depending on a sinusitis.

In regard to toxins, only those arising from a neighbouring local source need be considered, although it is of course possible that toxins absorbed into the blood from a distant focus may affect the chiasma. It is a characteristic feature of the action of toxins in the circulation, which affect the visual nerve path, that they exercise a marked selectivity in favour of the extracranial portion of the papillo-macular bundle, although, of course, their action is not limited to this part. Circulating toxins would therefore by preference produce ordinary retrobulbar neuritis. The proximate causes of disseminated sclerosis and of tabes are, however, said to attack the chiasma in some cases, although here also the optic nerves themselves are usually the site of election.

In regard to soakage or diffusion of toxins from the sphenoidal sinus, the chiasma is in quite a different position from the optic nerves, on account of the surrounding fluid. This explanation is applicable to the chiasma only if we postulate specially favourable anatomical conditions. If the clinical picture of chiasmal neuritis is to be produced without being masked by that of retrobulbar neuritis—and it is quite conceivable that both conditions might occur together—the optic nerves must be protected by thick bone, by position, or in some other way, and at the same time the chiasma must be specially exposed by conditions such as a well developed sphenoidal sinus, a prominent and thin-walled olivary eminence, and unusual shortness of the intracranial portions of the optic nerves. While such circumstances would possibly enable toxins to reach the chiasma by diffusion, it seems

unlikely that they would often all occur together. A powerful factor would be the development by direct infection of a local periostitis in the neighbourhood of the olivary eminence, with the production of a swelling possibly sufficiently elevated to touch the chiasma into which toxins might then be diffused, or to which an inflammatory condition might be communicated. As veins pass from the sphenoidal sinuses to the circular sinus (Evans[12]), the occurrence of such a periostitis in some cases seems quite probable. It must not be forgotten, however, that the occurrence of these pathological anatomical conditions has never been demonstrated.

When we come to consider the case in regard to tumours, it is necessary to assume that the zone of inflammatory œdema and cell activity which surrounds tumours, especially such as exhibit active growth and metabolic changes, contains toxins which can cause a neuritic process in the chiasma. In the tissues surrounding such tumours histologists have observed cell changes of a necrobiotic nature which have been attributed to the action of toxic metabolic products of the tumour. The causation of an active cyclitis by a necrosing glioma retinæ, an excellent case of which I saw some years ago, is a more familiar example of the action of these toxins. On this hypothesis, before actual pressure has developed, a neuritis may be set up in the chiasma by the tumour toxins.

We have seen that the results of operation often afford a strong argument in favour of pressure; there are, nevertheless, many cases in which it is not evident that the results have been due to relief of pressure. In two of Hirsch's cases the sella was opened but nothing removed, yet temporary benefit ensued. Throughout Hirsch's paper runs the assumption that the visual symptoms are due to pressure, and recovery of vision is held to prove considerable relief of pressure even when what was done at the operation had not led to any such expectation. The author himself expresses great surprise at the unexpectedly good results following very partial removal of the tumour which he obtained in some cases. At the same time he suggests that when a cyst has been evacuated its walls fall together, partly on account of pressure from the brain, and the remains of the tumour become confined to the sella. No doubt this is just what occurs, yet, if the brain pushes the remains of the tumour back into the sella in this way, the local pressure on the chiasma will be kept up to some extent and the relief cannot be very great. Remembering that the pressure theory depends largely upon the assumption that very slight pressure can cause well marked symptoms, the question arises whether the unexpectedly good results may not have been due, partly, at any rate, to some cause other than the relief of pressure.

The beneficial results of simply opening the sella or sellar decompression are well known. The amount of relief of pressure

is often probably very slight, and the evidence is not convincing that the recession of symptoms is due solely to removal of mechanical pressure on the chiasma. In some cases very similar results appear to have been obtained without opening the sella at all. In Case XXIII of my series it was not absolutely certain that the sella had been opened, and yet temporary improvement in the ocular symptoms followed. In this connection an interesting case is recorded by de Kleijn.[32] A woman of 41 years, complaining of defective sight, was found to have bitemporal hemiopia, together with posterior nasal sinus suppuration. Menstruation had ceased suddenly ten years before. The opening up of the sinuses was followed by an apparent great success. Headaches and vomiting disappeared entirely, and the patient became free from all symptoms except the visual defects. The exact state of the fields before and after the operation is unfortunately not stated. A diagnosis of bitemporal hemiopia due to post-nasal sinus disease was made. Three years later progressive visual disturbance and a positive *X*-ray picture indicated the presence of a tumour. It may, of course, be objected that the headaches were relieved by the removal of the pus from the sinuses and that this case is therefore not comparable with Case XXIII in my series, in which headaches were relieved after the opening up of healthy sinuses. In de Kleijn's case, however, the headaches returned apparently after three years, although at that time there was very little suppuration in the nasal cavities.* In any case, allowing for the psychical stimulus and the difficulty of distinguishing *post hoc* from *propter hoc*, it must be remembered that beneficial results are recognised as following the scraping out of the post-nasal sinuses in cases of retrobulbar neuritis whether definite signs of inflammation are observable or not (Fraser[18]). This does not seem altogether surprising as the practice of leeching or blistering the temple is common and popular in retrobulbar neuritis, and bleeding from the mesial orbital wall should, one would imagine, be still more efficient.

These considerations suggest that it is possible that operation does not always act by the removal of local pressure in the sense of removing a tumour actually pressing upon the nerve fibres, or even by the little extra room gained through sellar decompression, but that, apart from, or, at the least, in addition to these influences, the local blood-letting and devascularisation in themselves are important factors both in tumour and in inflammatory cases. While such local blood-letting may be of real benefit in sinus disease, in which a cure may result, in tumours only a temporary influence on

*Elsberg has reported a somewhat similar case. Infection of the sphenoidal sinuses with basilar meningitis developed in an acromegalic subject, followed by blindness in the right eye and a large temporal defect in the left field. After drainage of the sinus, both fields rapidly became normal.—*N. Y. State Jl. of Med.*, Nov., 1916. Ref. *Brit. Jl. Ophthal.*, Mar., 1917, p. 181.

vision can be expected. The depletion drains away the toxins, and in the sinus cases their source also is removed with resulting cure; in the tumour cases they soon re-accumulate and the visual symptoms recur. The distortion and displacement of the chiasma with little or no visual disturbance mentioned by Cushing and Uhthoff might be accounted for by the toxin theory if we suppose that in certain cases there is a relative absence of irritating substances around the tumour, and thus neuritis is not set up. Another suggestion, which may be glanced at before passing from this part of the subject, is that a selective action is exhibited by the toxins which attack the nerve fibre bundles in a definite order and thus produce the typical field defects. There is little in favour of, and much against, such a view, and although it would be a convenient assumption on which to base the solution of some difficulties, such as the production of similar fields under very varying conditions, its serious consideration seems hardly necessary.

In a paper by Schnabel[47] a discussion of this question is recorded, the author being in favour of toxins, while others, on the whole, supported pressure. Walker[58] lends some support to the toxin theory. Uhthoff, on the other hand, does not even discuss the toxin theory in regard to the chiasma. A peculiar case recorded by Battiscombe[3] is worth mentioning here. A woman developed photophobia and then extreme conjunctival chemosis. Vision was good and the fields uncontracted apparently to within a day of her death. Post-mortem.—Suppuration in the sella Turcica was found, the diaphragma sellæ forming the bulging roof of an abscess, the upper and anterior part of which was indented by the chiasma. Both toxins and pressure in this case had unusual opportunities, yet apparently no gross visual defect was produced.

There is insufficient evidence that toxic substances are present and active in the immediate neighbourhood of tumours, though their existence may not unreasonably be inferred. Like the pressure theory, the toxin theory is merely a working hypothesis for the purpose of explaining clinical observations. None of these explanations covers all cases, nor has any one of them been proved. Each appears to be specially applicable to a certain set of cases. It is reasonable to suppose that both toxic and mechanical causes act, the latter mainly in the later stages.

Course of the field defect

The peculiar circular course of the defect in the fields, clockwise in the right and counter-clockwise in the left, is best explained by the arrangement of the nerve fibres in the chiasma. The researches of Henschen, Uhthoff, Wilbrand, and others are discussed by Wilbrand and Saenger,[64] who state that the crossed fibres spread out in broad loops over the whole chiasma extending to its sides and

angles. At the front of the chiasma they lie dorso-medially, at the back ventro-medially, and the lower layers of the posterior part consist of crossed fibres only. Of the uncrossed fibres some bend inwards in loops almost to the centre of the chiasma and others lie along its outer side (*see* Fig. 28). They are surrounded by and mixed with crossed fibres. The papillo-macular bundles form a broad band extending nearly to the sides of the chiasma, the crossed fibres being central, the uncrossed more lateral.

The crossed central fibres lie near the dorsum of the chiasma at first, but incline more ventrally as they pass backwards. Dean and Usher[10] found in monkeys that the macular fibres do not begin to cross until they are some distance within the chiasma, and that they begin to cross near the dorsal surface, becoming more ventral posteriorly, but never reach the lower surface of the chiasma. Thus the papillo-macular bundles practically form a miniature chiasma within the chiasma and rather towards its posterior part. The experiments of Parsons[39] and others have shown that in monkeys the retinal fibres retain the same relative positions in the optic nerves as in the eye, but become twisted over inwards at the chiasma so that the inner or crossed fibres come to lie more ventrally and the outer or uncrossed fibres assume a more dorsal position.

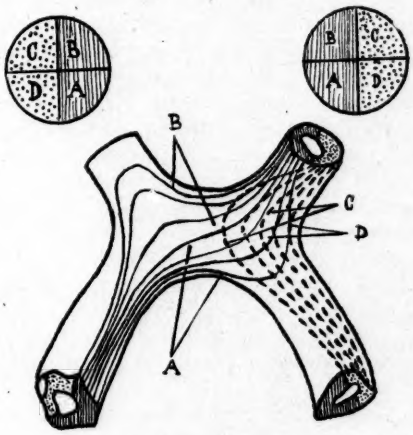

FIG. 28.

Suggested allocation of fibres.

Modified from Dejerine[11].

A Crossed fibres from lower-inner retinal quadrant.
B Crossed fibres from upper-inner retinal quadrant.
C Uncrossed fibres from upper-outer retinal quadrant.
D Uncrossed fibres from lower-outer retinal quadrant

According to this arrangement, the fibres from the upper-inner retinal quadrant (field quadrant 2) will be those which lie relatively dorsally and anteriorly in the chiasma (B) soon passing across and looping into the end of the opposite optic nerve, and thence along the opposite side of the chiasma to the tract. The fibres from the lower-inner retinal quadrant (field quadrant 1) will more rapidly assume a ventral position and will be those which lie along their own side of the chiasma (A) looping into the tract of the same side, thence crossing relatively posteriorly and ventrally to the opposite tract. Hence these fibres are the first to be affected by any interference coming from below. The uncrossed fibres from the upper-outer retinal quadrant (field quadrant 3) will be those which are looped farthest inwards (C) reaching almost to the centre of the chiasma, where they are mixed with the crossed fibres. Thus they may be affected before all the crossed fibres are blocked. Lastly, the uncrossed fibres from the lower-outer retinal quadrant (field quadrant 4) are probably those which lie toward the outer side of the chiasma (D) most remote from interference from an approximately central ventral lesion. The frequent presence of the temporal island in the fields, usually mainly if not entirely in the second quadrant, indicates the functional survival of some of the crossed fibres from the upper-inner retinal quadrant or from the junction of that and the lower-inner retinal quadrant. Their position is very possibly amongst those which cross most anteriorly and run down the sides of the chiasma among the uncrossed fibres. Such an arrangement would account for the field changes. A lesion affecting the lower and posterior part of the chiasma, where there are only crossed fibres, and spreading upwards, forwards, and laterally, would affect the field quadrants in the typical order and by attacking the inmost loops of the uncrossed fibres, while some crossed fibres were still spared, would give rise to the temporal island. Although this view of the development of the visual defects may be thought somewhat speculative, it is interesting that the peculiar looped course of the fibres should lend itself so aptly to the explanation of clinical facts of which the discoverers of this arrangement were unaware. The development and progress of the defects of the central area of the field indicate that the papillo-macular fibres closely follow the arrangement of the more peripheral fibres in regard to crossing and even to looping. The spreading out of the fibres into thin layers in the chiasma receives strong support from the clinical behaviour of the fields. Even in the early stages, in the non-scotomatous as well as in the scotomatous form of field change, the first signs of defect can be demonstrated in the central part of the field, a fact which would almost justify the inference, had objective evidence not been already to hand, that the nerve fibres are spread out in the looped arrangement described.

Let us now briefly review the subject from the clinical aspect. In the earlier stages the primary lesion, sinusitis, syphilis, tumour, or whatever it may be, sets up a disturbance in the chiasma, the symptoms of which are closely related to those of retrobulbar neuritis. The intensity of this disturbance varies with the nature of the cause, and the more active the condition is, the more likely are centro-cæcal scotomata to appear. When the activity of the primary lesion is slight, scotomata are absent, as in chronic acromegaly. As the primary condition may be of any intermediate grade of activity, there is no hard and fast line between the scotomatous and the non-scotomatous types of field change.

Cases without tumour usually have an inflammatory basis, and scotomata are nearly always a prominent feature. Recovery frequently occurs in a comparatively short time, any permanent loss of sight being often much less than was present when the condition was at its worst. The typical changes occur in the field of vision and have a strong resemblance to those of retrobulbar neuritis, rapid and extreme alterations being of common occurrence. The cause is usually supposed to be a local action of toxins on the chiasmal fibres, but may be a limited participation by the chiasma in the inflammatory process.

Tumour cases may be roughly divided into two chief groups: the chronic and the progressive. As a type of the former we may take chronic acromegaly which, as is well-known, is compatible with long life and useful vision. The tumour is intrasellar and grows very slowly: the characteristic field defects develop gradually and without scotoma. Often progress ceases and a stationary condition is maintained for many years, so that the development of more than the early or middle stages of bitemporal hemiopia may never occur.

Owing to inadequate observation the fields in these cases are often described as normal (see Fig. 27). The sella Turcica may be only slightly altered and becomes deepened rather than flattened.

In the progressive group the tumour grows more actively. The sella Turcica becomes flattened and the clinoids eroded in contradistinction to the deepening with elongation of the posterior clinoids which takes place in the former group. The case-histories are shorter; death often occurs in a few years, although there may be considerable variation in this respect (Frankl-Hochwart).[17] If acromegaly is present it assumes a more rapidly progressive character, the "acute malignant acromegaly" of Sternberg[50] and Gubler.[27] Recovery may sometimes occur, as in Case I, presumably owing to the spontaneous rupture of a cyst. In the visual fields centro-cæcal scotomata are always present, and the defects resemble those occurring in retrobulbar neuritis and in chiasmal neuritis due to sinus disease. The progressive nature of the condition is usually well shown by the presence of disproportionality

(Rönne)[44] in the fields, that is to say, the isopters mapped out by a moderately large white test-object (5 mm. to 10 mm.) may show relatively very little alteration in comparison with those found by a coloured or small white test. The cause of the field changes in tumour cases is attributed to pressure, traction, or local intoxication by toxins formed in or around the tumour, especially in tumours of the progressive group.

Up to a certain point the production of similar fields in inflammatory and tumour cases may be explained on the theory of chiasmal retrobulbar neuritis set up by toxins. In tumour cases, especially in the progressive group, it is obvious that after some time, varying in different instances, the growth will become large enough to exert, in addition, a purely mechanical influence. The chiasma now becomes pressed upwards and often forwards, and its connections become expanded, thinned, stretched, and compressed in various ways already alluded to. Thus in the later stages, after the space below the chiasma has been filled up, actual pressure or traction may come into play and, influenced by various circumstances, may disturb and modify the typical nature of the field changes. Thus we find cases progressing normally for some time and then suddenly changing from bitemporal to homonymous hemiopia. Such a change appears to be often followed by a temporary or possibly permanent cessation of progress of the growth, as occurred in Cases I and XV and in a case recorded by Würdemann and Barnes.[65] A very similar case is mentioned by de Kleijn[39] as being recorded by Erdheim. These changes may be due to the shifting of the incidence of the interference with the nerve paths by the bursting of cysts, or the giving way of dura mater or bone which had hitherto confined the tumour. The typical nature of the field changes becomes swamped, as it were, by the new influences introduced by the intracranial extension of the growth, so that the regular progress of the defect from one quadrant to another may be greatly modified or even completely altered. These considerations may help to explain the differences found by various writers as to which part of the field is retained longest.

We may, therefore, distinguish between the typical or regular and normal course of the field changes and the actual or modified course, the latter being the normal course as changed by later influences. Often the normal course persists to the end, the field terminating in the upper nasal quadrant. In other cases the relatively strongest portion of the nasal field is found to be at one time in the upper nasal quadrant, although the field may ultimately terminate otherwise. This relative superiority of the upper nasal quadrant will probably be found in the great majority of advanced cases if properly looked for. In order to detect this feature, the nasal field must be frequently examined at all stages with a declining series of test objects, so

that the typical changes may be discovered before they undergo any modifications.

In the present state of our knowledge there are naturally many exceptions to any rule of this nature, and one must agree with Walker and Cushing when they say that "there are many elements which enter into the chiasmal distortion which may affect the character of the fields and which are not thoroughly understood."

One other point remains to be noticed. In none of my cases has the remaining area of the upper-inner quadrant been followed to the vanishing point. The exact way in which the last fibres of the outer part of the uncrossed bundle become affected is a detail of only relative interest in the present instance, especially as at this stage, the regularity of the process is apt to be lost.

The difficulty of procuring material of the necessary kind, and at the particular stages which must be investigated, has made it impossible to bring forward histo-pathological evidence in regard to the cause of the field defects. In this series of cases only one post-mortem has occurred and the material was unfortunately not preserved. In most cases death only occurs after the stage at which an investigation of the parts would show what was taking place. It is therefore necessary to express on some points only qualified opinions at the present time.

The following conclusions, some of which are only tentative, may be enumerated:—

1. The perimetric defects in bitemporal hemiopia follow a typical or normal course of development. Commencing in the upper-outer quadrant the field is involved in a circular manner, the loss proceeding clockwise in the right field and counter-clockwise in the left, so that the upper nasal quadrant remains longest. This is the typical course and occurs in the majority of cases but, naturally, not in all.

2. The central defect or scotoma behaves in the same way, developing like a little field within the field.

3. This type of field defect is due to interference with the chiasmal fibres, but is largely independent of the exact nature of the ultimate cause; it occurs in bitemporal hemiopias from a variety of causes.

4. The immediate cause is very probably a chiasmal neuritis, a lesion comparable to that which, acting in the optic nerve, produces the symptoms of retrobulbar neuritis.

5. The cause of this chiasmal neuritis is not definitely known. In all probability it is set up in some way by pressure in many cases. The access to the chiasmal fibres of irritating toxic substances derived from the causal lesion may be the cause; and the presence of these substances may in some cases indirectly arise from pressure. In some cases the chiasma may directly

participate in an inflammatory process. The relation of the infundibulum to the chiasma is very probably of importance.

6. In tumour cases, and probably in some cases without tumour, mechanical pressure effects also act, mainly in the later stages when the tumour has reached a relatively large size.

7. In the later stages the normal type of progress of the field changes may be "swamped" by pressure effects and greatly altered.

8. These observations provide evidence from the clinical side in support of the looped arrangement of the fibres in the chiasma.

9. They also indicate that the papillo-macular bundle forms a little chiasma within the chiasma and that its fibres are similarly arranged.

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(Figure 26 is adapted from an illustration in Hirsch's paper.)

THE TONOMETER OF SCHIÖTZ*

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SCHIÖTZ' tonometer is known to us all, and it is unnecessary to describe the instrument; but as to its method of application, there are one or two points to which I wish to draw attention.

Devised by Prof. Schiötz, of Christiania, in 1905, and first used in this country in 1911, there are now eleven years during which

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workers with the instrument have had the opportunity of recording their experience from both a theoretical and practical point of view, and we should therefore be at this date in a position to say something of its value in our daily work.

The work done with the instrument in the laboratory by Priestley Smith, has resulted in his advising us as follows.—"when a tonometric observation is recorded, it is the *reading*, and not the supposed equivalent in mm. Hg. which should be stated. The reading is a fact, the other is an inference which may be correct or incorrect."

Few of us are in a position to question this advice, and coming from so experienced and trustworthy a source, we should accept it, and when using the instrument bear in mind the fact that we are working and thinking in the terms of the instrument, and not in terms which may be regarded as absolute.

From a practical point of view, however, it seems to me that the value of the instrument suffers on this account no depreciation in the hands of those who work regularly with it, and that provided we have a more or less agreed normal base-line on which to work, and at the same time realise that the units with which we record our findings are but units, and not strictly comparable with any standard units obtained in the laboratory, we must conclude that we have in our hands a piece of mechanism which by its value is worthy of a prominent place in the consulting-room.

The majority of those who have published their experiences appear to have felt the necessity of determining the measurements of the normal eye before proceeding further, and an examination of the results given shows agreement, within narrow limits, for the average normal measurement, and more or less agreement for the limits within which the tension of an eye in health may lie.

The average of these findings, from eight publications at my disposal, works out as follows:—

Average normal reading = 19.1. Limits of normal tension = 12.3 to 26.1 (Schiötz' original findings, being 20 and 15 to 25 respectively).

None of these findings, except one, is based on the examination of more than 100 cases, and most on less than that, and this, then, is my excuse for presenting to you my own results of the examination of 1,001 normal eyes.

The task—I purposely call it so—was begun in 1911, after about four months' experience with the instrument, and was completed early in 1913, and, to be accurate, occupied nearly two years.

The tabulated results, copies of which I hand round, were shown at the Oxford Congress in 1913. They have not been published for the reason that they but confirmed more or less the findings of other writers, but as I have now realized that those findings were based on not more than 100 results or little over (118 greatest

number), I feel that the results of 1,001 are eligible for wider notice.

The patients were ordinary hospital out-patients who presented themselves with symptoms referable to refraction error, and in no case was glaucoma suspected or other disease thought to be present, although such may have existed.

The results have been tabulated according to sex, age, and refraction error, and, in addition, I have worked out the percentage of eyes with readings of over 25 and under 15, and certain percentages where there was a difference between the two eyes.

The youngest case examined was aged 7 and the oldest 88.

In the first decade the average is distinctly higher than in any other, and in the sixth decade the number is higher than that of the others, owing to two cases, one being 24, and the other 28.25, neither of which can be positively said not to be incipient glaucoma.

The average of the whole is 20.06.

The lowest recorded result was 11.5 and was observed in two eyes in different patients; one a myope in both eyes and the other a hypermetrope in both eyes, the fellow eyes being 17.5 and 14 respectively.

In 1.7 per cent. only was the tension under 15.

The highest recorded was 30, 4 eyes in 3 patients, and the percentage of over 25 was 3.4.

A difference between the two eyes of the same patient was noted in 21.2 per cent. (a number much lower than that given by another observer), the difference varying from 0.5 to 7.5 and averaging 2.43.

The incidence of cases in which a difference in the reading in the two eyes occurred worked out according to decades, together with the average difference in each decade, gives the following information.—That in the first decade of life a difference is most likely to be found, whilst the last decade comes next, and the decade in which a difference is least likely to be found is that between 40 and 50, or the early presbyopic stage. The average difference is found to be highest between 50 and 60, and 60 and 70, and lowest from 30 to 40, the first decade also showing a low average difference (*vide* tables for figures).

Averaging my own figures with those of other observers, we have :—

The average normal reading = 19.58.

The limits of normal reading = 11.9 to 28.55, remembering that only 1.17 per cent. of cases show readings lower than 15, and 3.4 per cent. over 25. The latter for practical clinical use is the more important, and personally I am inclined to think that the figure 3.4 per cent. is too high, and that any reading over 25, except in the first decade of life, is so suspicious that it should be regarded as indicative of glaucoma until subsequent observation disproves the diagnosis.

Briefly, I wish now to refer to a few points in the method of application of the tonometer.

1. What drug should be used to anæsthetise the eye? Schiötz advises holocaine because it does not dilate the pupil, and in this I feel sure he is right. Some use cocaine, but we must remember that it is just in the doubtful cases that the tonometer is of most use to us in diagnosis and when a dilated pupil may prove disastrous. When therefore it is possible to obtain holocaine, why run risks?

2. The effects of malposition on the cornea have been well shown in the diagrams by Priestley Smith *(Ophthal. Rev.*, March, 1915*)*, and it is so clear that the tonometer must be placed on the centre of the cornea with the eye looking directly upwards that comment is needless.

3. As to where a patient should direct his gaze is not an unimportant item, for the effect of convergence upon the eye has been shown by Hine (*Trans. Ophthal. Soc.*, XXXVI, 1916, p. 226) to be to raise the reading slightly. It is well to note, however, that his results were obtained on only 13 cases, although the average effect is as much as 4.9 readings on the chart.

My own procedure has always been to direct the patient to look at the ceiling, but if unable to fix well, to look at a hand or object held at 1 metre above the patient.

If it is borne in mind that convergence may give a slightly higher reading, the value of taking a reading with the eyes directed towards a near object is not much diminished.

As to the number of readings which should be taken to arrive at a given estimation, the matter is well put by Ballantyne when he says our aim should be to take our first reading accurately and smartly.

Next comes the question as to the value of the instrument in practical use where it is necessary to estimate the tension in cases in which an increase over the normal exists or is suspected.

Let us imagine ourselves sitting in the consulting-room, ready to deal with cases as they present themselves, within easy reach of the tonometer, and then let us ask ourselves the question:—What are the cases in which we are likely to use it and what information will it give us?

The best answer lies, I think, in an examination of the case books, and with this object I have reviewed 70 consecutive cases (private ones, as the records are more easily at hand and fuller) in which I have found that I have had occasion to use the tonometer.

Of these 70 cases, 42 have been cases of undoubted glaucoma, mostly chronic, a few acute; most have been operated on and there has been no question as to the diagnosis.

In all of these the tonometer has given a reading of over 25, and although some have been as low as 27 or 28, and have been lowered

below 25 by the use of miotics, subsequent observation of the cases has shown them to be indisputable examples of glaucoma.

Many other readings have been taken in the course of each case and have proved of infinite value in estimating the condition of the eye and its behaviour as regards miotics and the effect of fistulisation.

In the cases in which apparently only one eye was affected with glaucoma and the other was, at the time at any rate, free from any suspicion of the disease, the reading in the good eye was consistently below 25.

There remain now the 28 cases in which the aid of the tonometer was invoked, and which have not, up to the present at any rate, proved to be glaucoma.

All the cases were over the age of 40, and readings were thought necessary on account of symptoms suspicious of glaucoma, although in none were signs present, for central vision was normal, there were no field alterations, and there was no increase of the blind spot. The symptoms were, for example: undue ocular fatigue and pain on near work; inability to read for any length of time; smarting of the eyes with lacrimation, without anything being present to account for such complaints, and notwithstanding an accurate correction of refraction error, and, further, an undue rapidity in the increase of presbyopia.

It is unnecessary here to point out that we look to such an instrument as the tonometer to give us help in diagnosing glaucoma in its prodromal stages. Its aid is of a different kind when, for example, such symptoms are present as to indicate œdema of the cornea, where the diagnosis can be made beforehand.

Now of these 28 cases, which were only suspected ones, 18 gave readings below 25, and call for no further comment, whilst the remaining 10 gave readings of 25 and over at one time or another.

Five of these ten cases subsequently proved to be examples of arterio-sclerosis with high blood-pressure, and it is interesting to note that four of the five gave readings well over 25, the highest being 32.5.

Against this I have records of one case which gave a reading of 32.5 in each eye, but without any evidence of arterio-sclerosis.

As to the five cases in which arterio-sclerosis was present, the condition was not suspected at the time, but developed later, *i.e.*, in the course of years; three of the cases have been watched over periods of from 6 to 11 years, and it has been during that time that they have developed symptoms referable to high-blood pressure and have been treated for this by their own medical advisers. Under such treatment the ocular tension showed a gradual fall.

It may be that a percentage of these patients will develop actual signs of glaucoma later.

Some of them have been seen fairly recently and their ocular condition is satisfactory; others, I have been told by friends and relatives, continue to progress smoothly; whilst some have perhaps already been operated on for glaucoma by hands other than mine.

Table showing the results of the estimation of the intra-ocular pressure by the Tonometer of Schiötz in 1,001 normal eyes.

Age by decades.	Sex.	Emmetropia.	Mixed astig.	Hypermetropia	Hyperm. astig.	Myopia.	Myop. astig.	Averages.	Averages according to decades.
1—10	M. 10		2 19·50	8 23·00				21·25	12 23·75
	F. 2		2 26·25					26·25	
11—20	M. 96	14 19·73	7 21·14	32 19·98	12 21·42	21 21·36	10 18·30	20·32	259 20·69
	F. 163	28 20·57	28 20·78	39 21·50	50 19·80	13 21·53	5 22·25	21·07	
21—30	M. 68	18 18·83	6 17·33	9 20·18	16 18·50	14 20·64	5 17·40	18·81	224 19·30
	F. 156	46 19·28	20 20·10	30 19·00	43 19·84	11 21·77	6 18·83	19·80	
31—40	M. 47	17 20·59	2 17·28	17 20·14	10 19·65	1 17·50		19·03	159 19·13
	F. 112	24 19·87	5 18·90	49 19·53	29 19·58	5 18·30		19·23	
41—50	M. 55	26 20·80		21 17·96	6 20·66	2 15·00		18·85	180 19·26
	F. 125	31 20·77	13 21·73	55 21·14	16 19·98	6 17·60	4 17·12	19·72	
51—60	M. 33	20 21·76		11 18·43	2 24·00			21·39	113 21·47
	F. 80	26 20·80	5 21·60	40 20·09	6 20·58	2 28·25	1 18·00	21·55	
61—70 and over	M. 14	12 20·29		2 18·75				19·52	54 19·59
	F. 40	16 19·43	2 25·00	18 19·69		2 16·25	2 18·00	19·67	
Averages according to refraction		278 20·22	92 20·87	331 19·95	190 20·40	77 16·25	33 18·55	1,001 cases 20·06 average	

The small figures in each space represent the number of eyes "tonometrised."

Percentage of cases (according to decades) showing a difference of reading in the two eyes

1 — 10	50 per cent.	51 — 60	41·67 per cent.
61 — 70 and over	42·28 „	31 — 40	41·03 „
		21 — 30	35·54 „
11 — 20	43·38 „	41 — 50	32·99 „

Average differences according to decades

51 — 60	3·41	21 — 30	2·35
61 — 70 and over	3·04	11 — 20	2·11
		1 — 10	2·4
41 — 50	2·59	31 — 40	2·02

A NEW OPERATION FOR PTOSIS

BY

ERNEST E. MADDOX, M.D., F.R.C.S.ED.

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I HAVE practised, during the last four or five years, an operation for ptosis which, in suitable cases, has yielded so much more pleasing results than those I have ever been able to obtain by former methods, that a description of it may perhaps be justified.

Few will dispute that ptosis operations, however successful they may be reckoned surgically, rarely quite realize an artist's ideal from the æsthetic point of view. Gratifying immediate results, it is true, are obtained from artificial tendons, but a very natural prejudice exists against foreign bodies left in the organism. Strange to say, with the exception of Wray's punctures (for slight ptosis), and the little practised Motais group of operations, nearly all the procedures advocated in the present day, attack the tendon from the skin side, which mode of approach must, in itself, make for æsthetic loss, owing to the derangement of so many important structures, namely:

(1) The *skin*, whose natural folds cannot be disarranged without impairment of symmetry and beauty.

(2) The *areolar tissue*, which never recovers its original lissomeness after operative interference.

(3) The *orbicularis muscle*, which like all other muscles, acts best in the state of nature.

(4) The *orbital fascia*, which, being the suspensory ligament of the eyelid, is not improved by a large hole made in it.

(5) The numerous delicate *strands* which the levator tendon gives off to the skin, and of which many cannot fail to be severed or damaged.

Contrast with this the simplicity of approach from behind, after the precedent set, about the year 1858, by Sir William Bowman.

After double eversion of the eyelid, nothing intervenes between the surgeon and the tendon but a thin loose layer of that peculiarly accommodating membrane, the conjunctiva, which is no sooner divided along the upper margin of the tarsus and reflected from the tendon, than the latter lies in full view, and can be shortened without interfering at all with the natural beauty of the front of the eyelid.

Why, then, has Sir William Bowman's operation practically dropped out of use? Firstly, I think, because its procedure has been found a little too difficult, and, secondly, because the excision of a large piece of the tendon left the door open for possible disaster if the sutures should cut out and allow the lid to droop worse than ever. Moreover, it is impossible to excise the tendon without some impairment of the delicate structures connected with its anterior surface. It may be interesting at this point to quote the exact description of Sir William Bowman's operation from the first volume of the *Royal London Ophthalmic Hospital Reports*, where we read: "In one case . . . . Mr. Bowman applied a new plan—he everted the lid and excised the posterior or upper edge of the palpebral cartilage, with about half an inch of the tendon of the levator palpebræ inserted into it. Before the actual removal of the piece, very fine threads were passed so as to bring together the edges, and thus secure a shortening of the tendon of the levator muscle, to the extent of three quarters of an inch."

The operation to be described agrees with Sir William Bowman's in approaching the tendon from behind, but differs in that it does not involve excision of the tendon. There is no hazard, therefore, connected with the cutting out of sutures, neither are the structures connected with the anterior face of the tendon interfered with, as when the tendon is itself removed.

The procedure grew out of an interesting series of experiments to shorten tendons in general, on a principle which might be called that of "supported cauterization,"—that is to say, by streaking the bare surface of a tendon, to about half its depth, by narrow linear grooves, parallel with the fibres, and by then supporting the tendon with sutures to prevent it from stretching while the cicatrices are still young and tender.

Any application of heat impairs the vitality of living tissue for a certain time, and with impairment of its vitality, is lost its vital elasticity, so that in the case of an ocular tendon the natural tension of the muscle would stretch the weakened fibres during the first fortnight or so were no provision made for support. My experiences with the other ocular tendons are not yet so complete as with the levator, in which latter they have now been watched for a sufficient number of years to let me speak with confidence.

For the posterior operation under present consideration, the

only special instrument required (and that is more convenient than essential) is made easily by soldering an oval strip of metal transversely on to the tip of one leg of the ordinary fine mouse-toothed conjunctival forceps, made with a clasp, as shown in Fig. 1, and so as to extend about seven millimetres beyond the teeth.

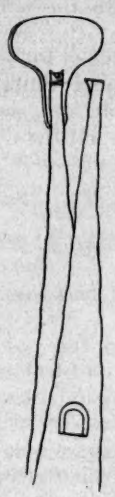


FIG. 1.

FIG. 1. Addition to clasped conjunctival forceps.

Other instruments advisable are fine conjunctival forceps, Stevens's curved scissors, narrow Graefe knife, fine clasped forceps with curved extremities for gripping the tendon, three double-armed sutures of No. 1 silk, or a little stouter, greased with carbolised vaseline, a needle holder, and two fine black conjunctival sutures.

The sutures are placed in carbolic, 1 in 40; and gauze wetted in the same solution is laid on the cheek and brow, after the usual sterilisation of the eye and lids. Adrenalised cocain affords ample anæsthesia, though for very young or nervous patients general anæsthesia is preferable.

After effecting the first ordinary eversion of the lid, the second eversion is made by grasping the extreme apex of the tarsus with the lid evertor, so that the metal plate shall lie against the tarsus, which is then everted the second time, and maintained in position by the weight of the instrument as it lies upon the brow. The whole field of operation thus lies fully exposed. The conjunctiva is now divided along the upper margin of the tarsus. This is most easily done by transfixion with a narrow Graefe knife, after which a pair of scissors reflects the conjunctiva from the tendon so as to leave it

fully bared. Its fibres are then seared, with an electro-cautery, in longitudinal furrows from the tarsus to as high up as the case requires.

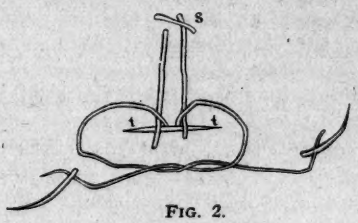


FIG. 2.

FIG. 2. Central suture before being tied. S, double turn in tendon. t, t, cut edge of tarsus.

The centre of the tendon, a little higher up still, is now grasped in fine locking fixation forceps, made preferably with slightly curved ends, so that one needle of a double-armed suture can be passed through the gripped portion of the tendon rather deeply, twice over in the same direction so as to include a bundle of the tendon fibres in a ring of thread, shown in Fig. 2, which tightens as the ends of the suture are pulled on. It would, of course, be imprudent to tie this in a knot because of the impossibility then of removing it after healing. Two similar sutures are placed on either side of the first, though even without their aid a good result is sometimes easily obtainable by the first suture alone. Their only object is to maintain the symmetry of the lid. Next, the apex of the tarsus is to be snipped off with scissors (though for a small effect this can be dispensed with), and the two needles of the central suture, either with or without an intermediate dip into the tendon, are passed solidly through the tarsus side by side, not too near its cut edge, from the conjunctival surface to the deep surface, and the needles brought out *between* the parallel threads (as in Fig. 2), so that the knot, when the suture is tied, shall be sunk behind the upper edge of the tarsus without touching the cornea. Before tying, however, the two lateral sutures are passed through the tarsus similarly, and then all are knotted. Two or three fine sutures to replace the conjunctiva complete the operation.

The use of the lid evertor makes the operation extremely easy of performance, though with the slight penalty that the immediate result is not always so good as the remote one (herein differing from most ptosis operations), owing to the stretching of the levator muscle. When desirable to avoid stretching, it is necessary to dispense with the lid evertor, and work more or less in a cavity, into which a small electric light must be kept shining.

In any case the sutures should be left undisturbed for two, or preferably three, weeks, when their withdrawal is quite easy. It

should be effected, however, with as little stretching of the tendon as possible. The natural wrinkles in the skin of the lid should be found not altered, but merely accentuated. The greater the power left in the levator, the greater the success of this operation, and time does not appear to lessen its effect. On the contrary, though the natural wrinkles of the skin display themselves quite prettily, the full effect of the operation is sometimes not obtained for three or four months. Herein it differs from those in which the effect begins at once to diminish. Perhaps the stretching takes some months to be recovered from, or it may be that the cicatricial contraction continues. Be this as it may, the final result is generally very pleasing, as I have proved in patients as young as five years and as old as seventy. The operation does some good in nearly all kinds of ptosis, but most, of course, when the tendon is well developed and the muscle not too completely paralysed. Not having yet applied " supported cauterization " to the tendon on the skin side, or to the suspensory ligament of the lid, I can say nothing about its merits, if any.

No purely posterior operation is, of course, available in the congenital absence of a levator, but in acquired ptosis it always does *some* good, since even if the levator be completely paralysed, the mere elasticity of the tissues working against the orbicularis counts for something. A posterior operation can, if necessary, be supplemented by an anterior one, such as Pagenstecher's sutures, to bring the frontalis into play as well.

The oft-given caution need scarcely be reiterated that before undertaking any operation for complete ptosis, care should be exercised that troublesome diplopia shall not follow the uncovering of the pupil.

ON MACULAR PERCEPTION IN ADVANCED CATARACT

BY

GEORGE YOUNG,

OPHTHALMIC SURGEON TO THE ESSEX COUNTY HOSPITAL, COLCHESTER.

Is the macula sound? A daily question in mature senile cataract. Our senses being nearly useless, experience guides us in deciding whether to operate or not. Macular disease occasionally eludes the most alert; inexpressibly aggravating are the consequences. Hoping to elicit something better, I venture to submit two methods which, at most, prognosticate a healthy macula.

For many years I placed a well centred, perforated disc in front of the test eye, the other being excluded. With a fine needle a hole, 0·2 mm., is easily made in a thin blackened card.

This, placed 10 mm. in front of the nodal point, or 5 mm. in front of the cornea, theoretically yields a retinal image of 0·3 mm. In the dark room a shielded light (electric ophthalmoscope or transilluminator is capital) is brought close to the hole. The patient, having discovered the luminous dot, is told to fix it. The disc is gradually removed as far as possible from the cornea to reduce the size of the retinal image. Fixation must be maintained. The hole sometimes needs to be enlarged.

In intelligent patients this test succeeds. It fails too often in dull and childish folk. Exact calculation of the image is impossible, owing to diffusion of light, the actual light area becoming considerably larger than the diameter of the hole; this matters less. But quickness of the eye and the impossibility of true fixation make actual macular perception doubtful.

A test is needed which can only be passed by direct vision. Experimentally I have just applied an old phenomenon, which needs no comment, being familiar to us all. I did not expect much, but it is because it gave such a positive result I describe it here. The patient, an unintelligent woman, over 70, had abolished red reflex, the lens was still tumid, and anterior chamber was shallow. Vision equalled fingers distinguished directly in front of the eye.

I used three discs, perforated by two, three, and four holes respectively, within a central area of less than 3 mm. Placing them successively in the frame I approached the eye as near as possible to the frosted focus light behind the largest aperture of my Thorington chimney. The patient was told to "look for the moon," and stated, without hesitation or error, when two, three, or four moons were seen, pointing out their relative position, which I was constantly changing by rotating the discs. The two-hole disc seemed to me to be most useful, each hand being used to follow the movements of the moons.

One can try this on one's own eye by holding an opaque glass disc close up to the eye with the perforated disc on the distal surface. The analogy to cataract is, of course, imperfect, the opacity here being in front of the cornea, to begin with. The accommodation of the lens, the size and action of the pupil perhaps also, can be nicely seen and observed. The moons alter their size, overlapping more or less.

I hardly think the moons could be counted and placed correctly with a defective macula. To prove this experimentally on the normal eye must be hard. But a disc of plain glass with a small spot of black sticking plaster placed at its centre, and held nearest the eye, the opaque disc and perforated one resting some distance in front of it, makes it impossible to see all the moons simultaneously and count them with precision.

DOUBLE ORBITAL SARCOMA

BY

MAJOR H. KIRKPATRICK, I.M.S.

SUPERINTENDENT OF THE GOVERNMENT OPHTHALMIC HOSPITAL, MADRAS, INDIA.

DOUBLE symmetrical sarcoma of the orbit must be sufficiently rare to make the occurrence of a case worth recording.

The case referred to occurred in a male Mohammedan Indian, aged 50 years, who was admitted to the Madras Ophthalmic Hospital on the 21st of July, 1916.

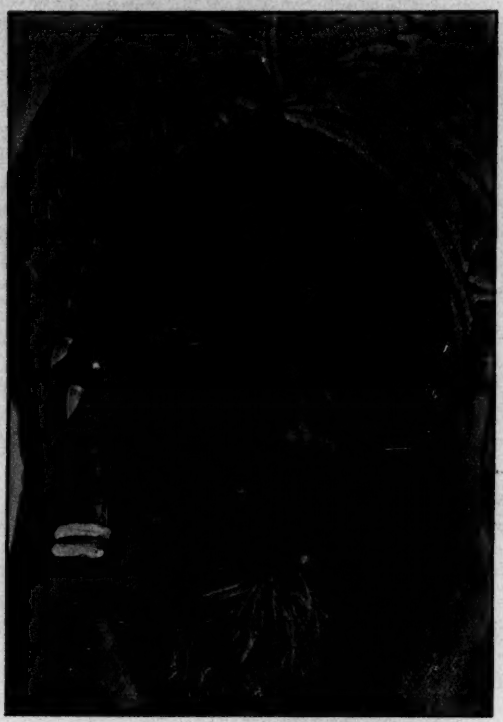


FIG. 1.

He stated that the trouble began in the right eye a year previously, when he noticed water, and later, pus collecting at the inner angle of the eye. Two months before admission, he observed a tumour in the lower lid of that eye. Watering of the left eye began six months before admission, and the tumour was noticed in

the lower lid one month later. This began in the lacrymal sac region and gradually spread outwards. No pain was ever present on either side. His general health had always been good, but he had suffered from excessive sneezing since the watering of the eyes began.

Both the lower lids were prominent and pouched, and a firm, well-defined tumour, which reached far back into the orbit, could be felt beneath each of them. The tumour on the left side was slightly bigger than that on the right (Fig. 1). But the difference between

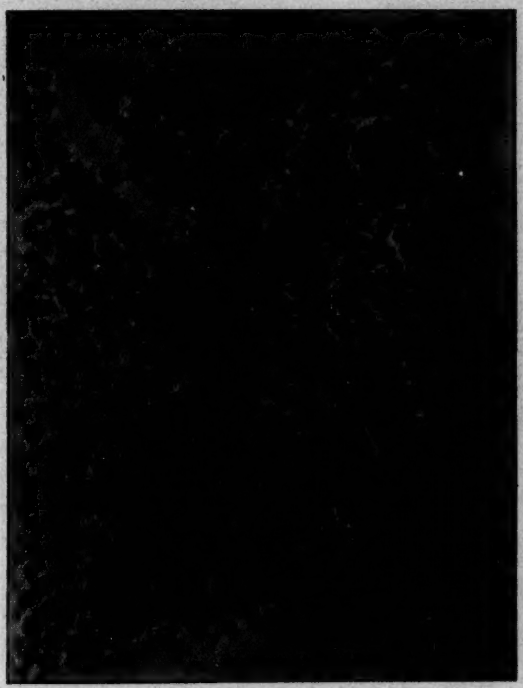


FIG. 2.

the two sides is somewhat exaggerated in the figure. The skin and orbicularis muscles were freely moveable over the tumours. Movement of the eyeballs downwards was limited. Purulent retention was present on the right side, whilst on the left the lacrymal passages were obstructed but free from retention. No glandular enlargement was present.

The tumours were removed on July 22nd, 1916. That on the left consisted of two lobules which were semi-transparent, with

bluish and pink mottlings, and were united by a firm fibrous band. It stretched far back into the orbit and was fixed to the inner wall and to the tissues behind. The right tumour was smaller and more elongated. It was lobulated but single. One very firm attachment lay over the lower end of the lacrymal sac, and it was also firmly fixed to the orbital tissues.

On microscopical examination (Figs. 2 and 3), the tumours were found to be identical in structure. They were composed of cell

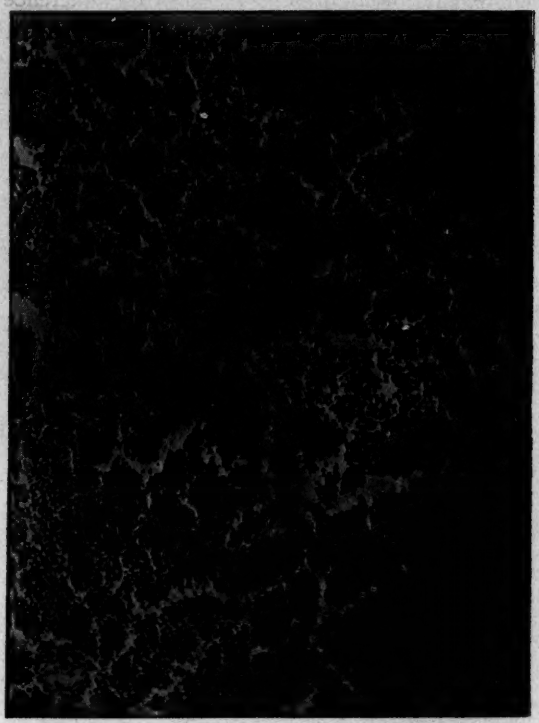


FIG. 3.

groups separated by fine branching spaces giving a streaky appearance to the section. Many of the spaces contained red blood corpuscles. The cells were rounded and oval, with very little protoplasm in proportion to the nucleus. Some of the nuclei had a vesicular appearance. The tumour was probably an endothelioma of sarcomatous type.

The patient made a very good recovery, but the action of the ocular muscles was interfered with for about a month. He was

last seen three months after the operation, at which time he was very comfortable and no recurrence had taken place.

I have to thank Sub-Assistant Surgeon Rangonath Rao for the photograph of the patient.

The micro-photographs were taken from the tumour removed from the right side.

THE HUNTERIAN LECTURES ON THE INDIAN OPERATION OF COUCHING FOR CATARACT

Delivered at the Royal College of Surgeons of England on February 19th and 21st, 1917

A Summary

BY

LIEUT.-COL. ROBERT HENRY ELLIOT, I.M.S. (retd.)

LONDON.

THE operation of couching for cataract was practised and described by Celsus at the very beginning of the Christian era, and many contributions to the literature of the subject have since been made. It is probable that it was introduced into Europe from the East, and it was certainly known and practised in the Orient for many hundreds of years before its first whisper in the annals of Western surgery. From the time of the advent of the British surgeon to India, couching attracted much notice, but it was not until the work of Lister began to bear fruit that the crude and filthy methods of the coucher excited a due amount of horror in the minds of the exponents of modern surgery. The lecturer has studied the methods of these men for over twenty years, and has collected and carefully compiled records of 780 cases of couching; in addition, he has been able to obtain 54 globes on which the operation had been performed. This latter collection he has now presented to the Museum of the Royal College of Surgeons of England.

There are two distinct operations performed, *viz.*, the anterior, in which the lens is attacked through the cornea or limbus from the front, and the posterior, in which the incision is placed behind the ciliary body, well back in the sclera. The latter is by far the more scientific procedure, two instruments being used, and a deliberate attempt being made to break down the suspensory ligament of the lens before its dislocation is attempted. Owing to the dirty methods of its exponents, and to the crude instruments used, the results of couching are very bad indeed, only 21·64 per cent. of operations yielding a visual result equivalent to 1/10 or better. It

is estimated that the coucher loses 60 per cent. of eyes which might reasonably be saved by better and cleaner methods of operating for cataract. The principal causes of failure are, in order of frequency, irido-cyclitis, glaucoma, and imperfect dislocation. In a few cases these men mistake other conditions, such as glaucoma, optic atrophy, and retinitis, for cataract, and operate on them. The lecturer dealt with the pathological side of the question and took up a number of subjects in turn.

The various directions in which the cataractous lens may be displaced

Dislocation forward was found only four times in the 54 globes examined. In one, the lens lay impacted in the angle of the chamber; in one, it was fixed between the ciliary body and the sclera, having reached that position by way of the broken-down pectinate ligament; in one, the capsule of a Morgagnian cataract, blocking the angle of the chamber over a wide area, was the only evidence of the lens remains; its nucleus and the contained fluid had escaped. ***Dislocation backward*** was the rule. For convenience sake, all such dislocations are classified into a number of groups according to the position of the lens and the greater or less amount of fixation it displayed in its new position: (1) The lens was found floating freely in the vitreous, which was little altered in structure, although presenting slight filmy evidences of inflammatory infiltration. (2) The lens was entangled in a more or less consistent exudate, which occupied the anterior portion of the vitreous chamber, and which distinctly limited its movements. (3) The lens was fixed to the back of the iris and ciliary body, or to some neighbouring part, by definitely organised inflammatory tissue, which represented a further stage of the process sketched in the previous class. The degree of organisation present in the shrunken cone of vitreous, which was usually in continuity with the inflammatory tissue fixing the lens, varied very greatly in different cases. In some, definite fibrous tissue was abundantly in evidence. (4) The lens was matted in a dense mass of cicatricial tissue, lying between the inflamed iris and ciliary body in front, and the completely detached retina behind; the detachment of the retina had been produced by the shrinkage of the inflammatory exudate poured into the vitreous cavity. In these cases the septic infection had clearly been of an intense character, and the inflammation set up had been correspondingly severe. (5) The lens, although dislocated backward, lay in front of the anterior hyaloid membrane, and therefore outside the vitreous chamber. The septic infection also appears to have been less intense. These two factors distinguish the globes of this group from those just previously considered, with which, in other respects, they have distinct

affinities. (6) The peripheral cortical remains of the lens lie *in situ* imprisoned in the capsule, and are all that is left of the cataract; they correspond to the after-cataracts met with after extraction. (7) In two cases the lens was thrust in its capsule through the retina, and lay between that membrane and the choroid coat.

Accidental injuries to structures other than the lens during couching

Although the object of the coucher is to dislocate the lens, he may accidentally injure any of the other structures of the eye. These are now taken in turn:

The Cornea.—Opaque scars on the cornea are frequently met with clinically, but are difficult to recognise in formalin-hardened specimens. In one case a fistula of the cornea was present; it had been associated with anterior staphyloma, which had burst along the track of the original injury, leaving a permanent drain behind. In another case there was a capsular-corneal synechia, and in a third a retino-corneal synechia.

The Sclera.—Injuries of this coat are common, as the incision is made through it in the posterior operation, but they are hard to discover, and there is an element of chance in their detection. They are best recognised by the pigmentation that follows disturbance of the underlying uveal coat. In one case, a scleral fistula persisted as a result of the operation, and gave rise to a filtering cicatrix on its surface. In another, the scleral wound had closed firmly by cicatricial tissue, in which the ciliary body was impacted. Lastly, there was an instance of a wound through the limbus, in which the scar could be followed throughout its course in microscopic sections of the part.

The Uveal Tract. — Injuries to the iris are commonly seen clinically, and are also to be found in evidence in the series of globes before us, either in the form of tears, which widely alter the outline of the pupil, or in that of atrophic scars. In one case, already referred to, the ciliary body is extensively detached from the sclera by traumatism, and in a number of others a similar detachment is due to the shrinkage of the inflammatory exudates within the eye. Wounds of the ciliary body itself are common; some of these lie across the front of the ciliary processes, or at their junction with the iris; others cut right through the processes themselves; whilst yet others lie in the orbicularis ciliaris. Nor does even this mark the posterior limit of the scars made by the coucher's incisions, for there are globes which show these lying on the equator of the eye, and even well behind it. Not the least interesting of these is one in which a strictly localised inflammation within the tunics of the eye marks the spot at which the copper tip of a coucher's probe had probably been broken off during the operation.

Uveitis.—The type of inflammation of the uvea found in these specimens was, with one exception, plastic, and was mostly confined to the iris and ciliary body. The intensity of the septic infection varied greatly in different specimens, and this was faithfully reflected in the severity of the inflammatory process found in different globes. In some, the latter was extremely slight, whilst in others it led to severe matting of the parts, which wholly obscured the normal anatomical arrangements. All intermediate stages between the very slight and the very severe inflammations could be readily traced. The lenses involved in the inflammatory changes showed phagocytosis, liquefaction, or calcification, as the case might be. In only one instance has any evidence of proliferative uveitis come to light, and in this one the nodule in the iris consisted of mononuclear leucocytes; epithelioid and giant cells were conspicuous by their absence. The interest of this observation lies in the evidence it affords that the danger of sympathetic mischief in the second eye is not great after the operation of couching. The lecturer's clinical experience bears out the correctness of this view.

The Chambers of the Eye

The anterior chamber was found very shallow in a large percentage of cases; in several of these "*iris bombé*" was present. A rare condition was the complete obliteration of the cavity by adhesion of the iritic exudate to the posterior surface of the cornea. Abnormal contents were found in a number of cases; these consisted of pus, of blood, of a mixture of pus and blood, of vitreous, of lens matter, and of structureless albuminous exudate.

The vitreous chamber.—In the great majority of the eyeballs, the vitreous body had become infiltrated with inflammatory material, which tended to undergo organization, to contract adhesions to the retina and to the iris and ciliary body, and, finally, to shrink and become detached, dragging the retina away from its bed in the process. The steps would appear to be:—(1) an infection of the vitreous body and of the structures surrounding it by septic matter during the operation; (2) the outpouring of an inflammatory exudate into the vitreous, partly as a result of inflammation of the uveal tract and of the retina, and partly in consequence of the chemotaxic attraction exerted by the infected hyaloid body; (3) the organization of these products and the contraction of adhesions between them and the retina; and (4) their contraction resulting in retinal detachment. The organization of the exudate was most marked in the neighbourhood of the optic nerve and in that of the ciliary body. In some cases a definite cone of exudate was present; in others, the effusion was represented by a mass occupying the anterior portion of the chamber. This latter appearance is due

simply to an artefact, the apex of the cone of exudate being broken across, either in the preparation of the specimen, or in the subsequent handling. This has been proved in a number of ways. These cones of exudate are intimately connected with, and frequently form part of, the inflammatory material which has been described in a previous section as fixing the dislocated cataract immovably in its abnormal position.

The Retina

Detachment of the retina occurred in over 70 per cent. of the globes. All stages were represented from very slight and partial detachments up to absolutely complete ones, and to those in which the retina was rolled up in the shape of a stick. In the immense majority of the cases, the cause of detachment was contraction of the exudate which occupied the vitreous cavity. The following three other causes were operative in a very limited number of cases.—(1) Direct trauma from the push of the operator's knife; (2) displacement due to the lens being thrust through and under the retinal coat; and (3) the pouring out of blood between the retina and the choroid as a result of the wounding of the vessels of these coats.

Dots on the retina.—A striking feature of a large number of the globes of this series is the presence of numerous dots on the retina. These varied greatly in size, in colour (from white to grey, or glistening), and in number; but in one form or another they could be recognised in more than 50 per cent. of all the eyes examined. Some of the specimens show them so prominently that it would be hard to overlook them, whilst in others a careful search with a lens was required to reveal their presence. Most of the cases were of very long-standing, indicating that probably the phenomenon is a degenerative one; but, on the other hand, it is to be remembered that although the histories given showed it was many years since the couching, the actual loss of sight had not infrequently been due to a comparatively recent intercurrent inflammation. Considerable difficulty has attended our search for the anatomical cause of these dots, and the investigation is not yet complete, but three appearances have been found which seem likely to be sufficient to account for the dots in different cases; it is quite certain that the cause is not the same in all. These three phenomena are: (1) localised proliferation of cells along the course of some of the retinal vessels; (2) collections of mononuclear cells on the surface of the retina lying external to the limiting membrane; and (3) small cysts developed in the walls of the retina, as the result of the coalescence of œdematous spaces therein formed. Of the latter process, there is abundant evidence in quite a number of the specimens.

Glaucoma

If due allowance be made for the fact that a number of the globes had undergone late changes which were calculated to hide the evidence of a previous glaucoma, we find that 19 out of the 30 left had suffered from high tension. In 3 of these the angle of the chamber was freely open, and in 16 it was closed. Of the 3, one showed a free communication between the aqueous and vitreous chamber; in the second a bulky Morgagnian lens closed a large part of the angle of the chamber; and in the third there was good reason to think that the glaucoma had existed before the operation was undertaken. Taking the remaining 16 cases, together with certain others in which the presence of glaucoma could no longer be established, the following conditions found present afford reasonable explanations of the causes of the raised intra-ocular pressure. In one there was a corneal fistula following a corneal staphyloma; in one there was a capsulo-corneal synechia; in one a retino-corneal synechia; in 5, the ciliary body was involved in the scar; in 6, the dislocated lens pressed extensively on the iris base; in 3, the lenses were tilted at right angles to their normal position; in 5, the pupil was blocked, and in 3 of these *iris bombé* was present; in 2, the interior layer of the hyaloid was much thickened by inflammatory exudate; in one, there was a dense after-cataract; and in one, glaucoma had evidently been present before the operation.

ABSTRACTS

I.—THE RETINITIS OF ARTERIO-SCLEROSIS

Moore, R. Foster (London).—The retinitis of arterio-sclerosis and its relation to renal retinitis and to cerebral vascular disease *Quarterly Jl. of Medicine*, Vol. X, Nos. 37 and 38.

Foster Moore has contributed an article of interest, the outcome of painstaking and accurate observation. The subject is considered under three heads:

1. The evidence of arterio-sclerosis revealed by the ophthalmoscope.

2. An endeavour to show that a condition of retinitis may be engrafted on this—a condition with distinctive characteristics differing markedly from those of renal retinitis and therefore deserving of separate recognition, and

3. A consideration from a study of cases of the extent to which

disease of retinal vessels is indicative of similar disease of cerebral vessels.

1. Moore considers the characteristics of retinal arterio-sclerosis as described by Marcus Gunn:

(1). *Irregularity of lumen of arteries.*—This he regards as not distinctive. It may not be present even with a high degree of arterio-sclerosis. If it is present it is an indication of severe disease and of a high blood pressure.

(2). *Tortuosity of the arteries.*—This is seldom extreme in degree and is not a very valuable sign, as considerable tortuosity may occur under physiological conditions.

(3). *Central light reflex.*—This is an exceptionally narrow and bright central light streak which may show a series of brighter points at intervals. This Moore considers one of the most important universal signs, yet subject to misinterpretation, as it is only an exaggeration of normal conditions.

(4). *Loss of translucency of arterial walls*, and

(5). *Obstruction of blood flow in veins* where they are crossed by arteries.

These two signs he considers very valuable, as they are never seen apart from arterio-sclerosis. They are always present in it, and their variations are so visible that they form a trustworthy means of judging the extent and degree of sclerosis.

The evidence of obstruction is of two kinds: (*a*) the actual effect on the vein by "banking;" (*b*) the displacement of the line of the vein. Thus a vein may be approaching an artery at an acute angle, but it suddenly goes off and crosses under the artery at a right angle and after it has crossed resumes its former line. This displacement Foster Moore considers the most striking and important single sign of severe retinal arterio-sclerosis.

(6). *Oedema of retina*, mentioned by Gunn, he does not regard as a necessary sign of arterio-sclerosis.

Other changes may occur in the arteries. A general reduction in size, although it is a condition difficult to prove, Moore thinks does occur in arterio-sclerosis. In some cases the lumen of an artery may become completely obliterated and the former vessel is then represented merely by a fibrous white thread. Retinal hæmorrhages are, of course, incidental to arterio-sclerosis, and the different types are described. Some degree of optic atrophy may also occur in arterio-sclerosis, and results from one of two conditions: (*a*) thrombosis of a retinal artery or its branches; (*b*) gradual narrowing of arterial branches, and consequent insufficient blood supply. The former is sudden in onset, the latter gradual. Lental opacities he does not consider as necessarily associated with arterio-sclerosis. As regards sex-incidence of arterio-sclerosis, his impressions agree with those of Nettleship and Gunn, *viz.*: that females are more

prone than males to suffer from arterio-sclerosis, and his observations indicate that women are more tolerant of a high blood pressure than men.

2. The second part of the paper is devoted to an endeavour to show from a study of a number of cases that a retinitis may be engrafted on a condition of arterio-sclerosis, and that this retinitis deserves recognition as a separate clinical entity. Arterio-sclerosis, as was shown by Gull and Sutton, is a disease of small vessels. The renal and retinal vessels are affected in this disease as well as other small vessels in the body, but Foster Moore believes that the retinitis which develops in arterio-sclerosis is solely due to disease of the retinal vessels. No doubt, as disease in the renal vessels progresses, renal insufficiency may be produced, and soft-edged areas of exudate may appear similar to those found in chronic parenchymatous nephritis. But the distinctive characters of the change in arterio-sclerotic retinitis are shown in : (1) the character and arrangement of the exudate ; (2) the changes in the dots which are slow to develop and slow to undergo change, although they may completely disappear : (3) the "pipe-stem" sheathing of the arteries ; (4) the unilaterality of the condition ; and (5) the histological character of the exudate which is found entirely in the internuclear layer, and is seen to consist of masses which are perfectly homogeneous and hyaline in appearance—thus indistinguishable from the exudate in renal retinitis—although none of the large phagocytic cells so common in many sections of renal retinitis were found in these cases.

Further evidence for the view that arterio-sclerotic retinitis is a separate entity from renal retinitis, is to be found in the ophthalmoscopic appearances : (1) the evidence of well-marked arterio-sclerosis ; (2) retinal hæmorrhages tend to be smaller and more scattered than in renal retinitis ; (3) the retinal exudate already mentioned ; (4) the rarity of woolly patches (if these are present they indicate the beginning of renal insufficiency) ; (5) retinal œdema does not occur and therefore detachment is rarely if ever produced ; (6) the "star" figure may be present in either variety ; and (7) changes in 45 per cent. of cases are unilateral, while in renal retinitis changes are nearly always present in both eyes.

Further, the gradual evolution of arterio-sclerotic retinitis from arterio-sclerosis can often be studied in an individual, and a comparison of groups of cases of arterio-sclerosis and of arterio-sclerotic retinitis, show the existence of similar but more advanced vascular changes in the latter. Also, the duration of life is longer in cases of arterio-sclerotic retinitis than in cases of renal retinitis, and cerebral hæmorrhages are a much commoner cause of death in these cases than is uræmia.

3. The third part of the paper deals with the relation of

sclerosis of the retinal arteries to cerebral arterio-sclerosis. Two groups of patients have been studied. One group consisted of 44 patients admitted to St. Bartholomew's Hospital suffering from hemiplegia of sudden onset, *i.e.*, vascular brain disease. Of these, 70 per cent. showed evidence of retinal vascular disease, and in 43 per cent. this was severe in degree.

Another group of 66 patients attended at Moorfields on account of impaired vision, the result of retinal arterio-sclerosis. Information is available as to 46 of these, and in 21, *i.e.*, 46 per cent., there had been a vascular lesion ; 18 are known to be still alive.

It will be recognized that this paper is an important one. It is illustrated with tables and excellent plates, and all the points are carefully and conscientiously worked out. The main points which seem to be clearly established are the existence of a condition of arterio-sclerotic retinitis, developing out of arterio-sclerosis of retinal vessels. The absolute distinction between this and renal retinitis is not quite definite perhaps, and there seems to be, in the mind of the observer, the suspicion that some cases can be claimed to belong to either category. It appears, however, to be quite clear that patients suffering from arterio-sclerosis, and patients the subjects of arterio-sclerotic retinitis, are peculiarly prone to vascular lesions of the nervous system.

JAMES TAYLOR.

II.—ALPHABET KERATITIS

(1) **Haab, O. (Zurich).—New observations upon the cornea and the retina (Neue Beobachtungen an Hornhaut und Netzhaut des Auges.)** *Correspondenz-Blatt für Schweizer Aerzte*, 1916, Nr. 33.

(2) **Haab, O. (Zurich)—Alphabet keratitis (Die Buchstaben-keratitis.)** *Beitr. zur Augenheilk.*, June, 1916.

(1) **Haab**, in a clinical lecture delivered before the Society of Medical Men in Zurich (February 26th, 1916), told his hearers that any clinical facts he had discovered were to be ascribed to the methods of examination he had learned from his former teacher, Horner, who was one of the first to lay stress upon the value of oblique illumination and of the direct method of ophthalmoscopy.

Examination of the eye by oblique illumination with the *loupe* was introduced in comparatively recent times, and yet this small instrument is one of the most valuable we possess. Hartnack's *loupe* is generally used, but further help can be gained by employing a binocular instrument, of which there are several.

Using this method, Haab had discovered reticular keratitis, and band-shaped opacities in the cornea in cases of infantile glaucoma. He also was able to describe the cerebral light reflex. He now draws attention to a new disease—"alphabet keratitis" (*Buchstabenkeratitis*).

Although he still uses the old lens of Hartnack, the source of light has been improved by the introduction of the Nernst lamp. This light is very powerful and white. With the Nernst lamp, one not only sees better, but more, than with gas or ordinary electric light. Gullstrand has improved the Nernst in his "slit light." With this instrument it is possible to see the nerve-fibres in the cornea, and the currents in the aqueous, which have recently been described by Berg, of Stockholm. More recently the half-watt Osram lamp has been constructed. It gives a powerful light which is so like sunlight that it will show that interesting reflection known as the Japanese magic mirror. The magic mirror is made of bronze, and on the reverse side there are relief figures of animals, flowers, or letters. The mirror is beaten slightly convex, and the reflecting side polished. In a strong light at a certain angle of reflection the figures can be seen on the apparently perfectly plane side. This reflex can be obtained with the half-watt lamp. The experiment shows why with this source of illumination we can see things in the cornea which are otherwise invisible.

"Alphabet Keratitis" is a rare affection. In the last eighteen years Haab has seen it only seven times. With good oblique illumination, the surface of the cornea is seen to be raised in places into lines which cross and recross, giving the appearance of letters of the alphabet. The lines are straight and of different lengths. The broader lines have in places a double margin, and here and there, in both the single and double lines, there are round infiltrates. In places it looks as though a row of punctate dots were joined by right lines.

There is at first moderate irritation of the eye. The condition may occasionally disappear in three weeks. In other cases there are repeated relapses which give the affection its serious aspect. Sometimes the eye becomes soft and permanent deep-seated opacities destroy useful vision.

A severe case was treated by Haab with tuberculin. Béraneck's tuberculin had no action, but one eye made a complete recovery after injections of Koch's old tuberculin. Haab remarks that it is impossible from one instance to suggest that the affection has a tuberculous basis.

This disease seems to be analogous to a condition described by W. T. Holmes Spicer and R. A. Greeves in a paper read before the Royal Society of Medicine (February 2nd, 1916) as "superficial linear keratitis."

Haab also has some remarks relating to the colour of the fundus. It is generally supposed that the red reflex is caused by the blood in the choroidal capillaries. This is a very common error. As long ago as 1877, von Bezold and Engelhardt pointed out that if the red reflex were really due to blood its light ought to give the absorption bands of hæmoglobin in the spectroscope, but it does not. Again in lipæmia, leucæmia, and pernicious anæmia, there is no marked pallor of the fundus. Cases of lipæmia in diabetes, where the blood is almost white, do not exhibit that pallor of the fundus which would be present were the red reflex due to the blood. Marx has shown that the blood has little to do with the reflex, which is caused by the pigment epithelium behind the retina.

Haab's final subject deals with the macula. This is a region of vulnerability, a *locus resistentiæ minoris*. When the eye has been contused, it is quite common to find that, in addition to Berlin's opacity, which is present at the seat of the blow, the macula also shows some œdema, a change which may cause permanent loss of function, and in some cases lead to the formation of a hole. These holes are found after blows and in senility.

Haab advises observers to pay attention to the oval reflex which is visible round the macula. He has for many years made a special study of this foveal reflex, and finds that it is a very delicate index of the integrity of the macula. When the macula is becoming diseased, we can observe that the reflex grows less evident and eventually disappears. In retinal atrophy the reflex becomes first more extensive and then disappears. The increase in size shows that the fovea is getting shallower. If the disease of the macula disappears the foveal reflex may reappear.

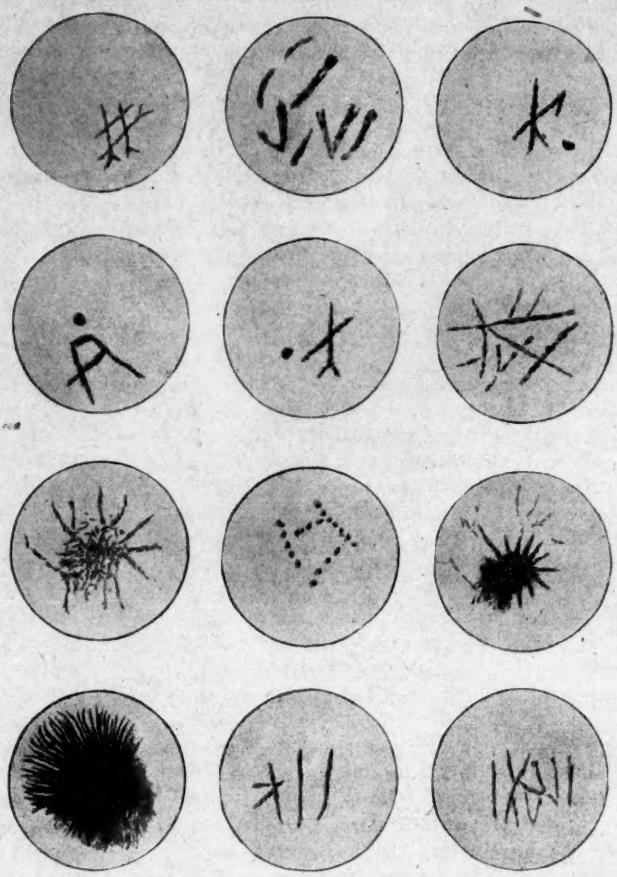
It is especially necessary to pay attention to the foveal reflex in myopia. Macular disease is here heralded by disappearance of the reflex, and calls for immediate and energetic treatment.

The linear reflex seen in exudative disease, such as papillœdema, is always pathological, and may go on to the formation of a " macular fan."

Haab urged his hearers to become competent in the use of the direct method of ophthalmoscopy. Such advice is hardly necessary in Britain. T. HARRISON BUTLER.

(2) **Haab** draws attention to a peculiar irritative and inflammatory disease of the cornea, usually affecting one eye. This he terms "alphabet keratitis" *(Buchstabenkeratitis)*. It appears to be analogous to, if not identical with, the condition described by L. Caspar (*Klin. Monatsbl. f. Augenheilk.*, 1903, p. 289) and by W. T. H. Spicer and R. A. Greeves (*Ophthalmoscope*, March, 1916). That it is a rare disease is shown by the fact that during the last eighteen years, Haab has met with only seven cases (ranging in age from 14 to 34 years), all of which are fully

described in the present communication. The malady is characterised by a number of straight, superficial ridges, of grey colour, in the cornea, commonly arranged vertically, which often meet at angles and cross and re-cross. and in that way may come to resemble letters of the alphabet, examples of which may be seen in the



accompanying figures. The lines may be double-contoured, and appear to include nodes here and there in their course. The affection may be associated with lowered intra-ocular pressure. It may last for a long time, and become very threatening as regards sight. Observation of the corneal changes is facilitated by the

employment of the half-watt Osram lamp and the Zeiss binocular magnifying glass. Injury played no great part in Haab's cases.

Haab carefully distinguishes *Buchstabenkeratitis* from other linear conditions of the cornea, such as striped keratitis, birth injuries, herpes febrilis, and lattice-like keratitis. He gives a hint that tuberculin should be tried, especially in the more severe cases.

S. S.

III.—DETACHMENT OF THE RETINA

(1) **Moore, R. Foster (London).—The retinal detachments of renal retinitis** *Royal Lond. Ophthal. Hosp. Rep.*, Vol. XX. Part 2, March, 1916.

(2) **Report of Committee on detachment of the retina** *Trans. Ophthal. Soc. U.K.*, Vol. XXXVI (1916), p. 352.

(1) **Foster Moore** discusses the retinal detachments met with in renal retinitis.

He considers that this complication is far less rare than has generally been supposed. The reasons for the failure to diagnose it more frequently are, that it occurs late in the patient's life, that the globular detachments are generally situated peripherally and are often transparent, and that the flat detachments are far from being easy to recognize. He mentions the cases which have already appeared in literature, and adds 13 of his own, found in a systematic examination of a large number of cases of chronic nephritis. There are two types of retinal detachment,—the flat, produced by solid subretinal exudate, and the globular, chiefly by fluid. Flat detachments can sometimes be demonstrated histologically, even although they have escaped ophthalmoscopic diagnosis during life. Globular detachments tend to be associated with pregnancy, to occur on both sides, and to involve the lower part of the retina. They are usually transparent, and appear to be tense. If the patient survives, they usually disappear.

Moore's experience is against the view that retinal detachments may develop during the course of a nephritis, in the absence of retinitis. In his opinion, the liability to detachment increases with the severity of the retinal changes, and is independent of the type of nephritis producing them. He describes the detachments as brought about by an active exudation of material, partly solid, but chiefly fluid, into the subretinal space, and he considers that the retina is to be regarded as the source of the whole of this exudate. There are three types of solid exudate: (1) fibrinous, (2) hyaline, and (3) granular. He claims that the two former at least are

indubitably of retinal origin; he gives his reasons for believing the same to be true of the fluid outpoured beneath the retina. He rejects the view that a condition of general œdema is a factor in the genesis of retinal detachment, which he looks on as a purely local manifestation, dependent upon the retinal disease.

Recovery with reattachment would appear to occur quite frequently, especially in pregnancy cases. If so, it is usually complete in two months. More or less extensive changes remain in the retina. This question is dealt with in some detail. The effects upon central visual acuity depend upon the retinitis rather than upon the retinal detachment, unless the latter involves the macula. In the cases examined intra-ocular pressure was unaffected.

The paper is freely illustrated.

R. H. ELLIOT.

(2) Readers may be reminded that at the 1915 Congress of the Ophthalmological Society of the United Kingdom a discussion was held on "Detachment of the Retina," and that the Society then appointed a Committee, consisting of Messrs. E. Treacher Collins, R. A. Greeves, M. S. Mayou, Leslie Paton, A. Maitland Ramsay, and J. B. Story, to report upon the cure of the condition.

The Committee presented its Report at the 1916 Congress, and an attempt is made below to present, as briefly as may be, its main facts:—

A circular letter, asking for notes of unpublished cases, or references to published cases, was issued by the Committee in May, 1915. A case was regarded as "cured" when the retina had remained in its normal position for six months, apart from any question of restoration of function. Records were obtained of twenty-one unpublished cases, and in order to widen the basis of the Report, the Committee utilized the records found in the more readily accessible suitable English (45), French (10), American (4), and German (26) literature. The following quotation may be made from the Committee's Report: "We think it only just to our own country to state that we have found, on the whole, the English cases most adequately and judicially reported, and that, as regards success from the patient's standpoint, *i.e.*, visual acuity, English ophthalmic surgeons lead by a very long way."

Eighty-five cured cases are in all reviewed, and the fact emerges that in no less than forty-four of them recovery followed some form of operation. Of the remaining forty-one cases, in seventeen cure was stated to have been the result of treatment. In twenty-four of the forty-one cases cure took place spontaneously. It is difficult to give too wide a publicity to the facts brought out by the Committee.

Myopia, present in fifty-one cases, was the predominant ætiological factor. In eleven cases simple traumatism (apart from myopia) was the cause of the detachment. Six of the

cases occurred in patients with albuminuria, and in four of these this was associated with pregnancy. In one case the detachment took place during a pregnancy where the urine was normal. In two cases the detachment followed extraction of cataract from otherwise normal eyes; and in the remaining fourteen cases the ætiologicol factor was unknown or indefinite.

In the greater proportion of cases some hazy or cobwebby opacities were described as present in the vitreous, but the existence of definite vitreous bands was mentioned once or twice only. Usually no tears were noted in the retina, but that the presence of a rupture in the retina does not negative the possibility of cure is shown by three cases collected by the Committee. The duration of detachment from onset to time of cure was found to vary from one day up to three and a half years, and the best results in so far as concerned restoration of visual function took place within the first four or five months, although a marked exception to this statement is noted by the Committee. Most of the cases were between twenty and forty years of age.

In 81·82 per cent. the operation responsible for cure was some form of scleral puncture, as by Graefe knife or galvano-cautery. In the relatively few cases (nine) where the subretinal fluid was aspirated and afterwards either it or normal saline injected into the vitreous, it is noted by the Committee that the visual results were not so good as by the other methods. In many of the cases dealt with in the Report the reposition of the retina was accompanied not only by marked improvement in the central vision but also by pronounced restoration of the visual fields. The reverse, however, was true of a few cases. Of the forty-four operation cases, twenty-six were in myopes; six in traumatic detachment: in two the detachment followed cataract extraction; and in the remaining ten the ætiology was unknown.

With regard to the twenty-four cases of spontaneous cure, in one case reposition took place after detachment had been present for 3½ years, and in another two years. In one case the condition underwent recovery during a golfing holiday; in another cure was after a blow from a tree; and in a third, after an attack of acute mania. The cases of spontaneous cure included thirteen myopes, five instances of traumatism, three of pregnancy with albuminuria, and three of unknown causation.

As to the seventeen cases of cure following treatment, more or less prolonged rest in bed was a measure employed in all, and to this the Committee assigns a most important rôle. In the majority of these cases the detachment had lasted only a short time, measurable by days or weeks. It is noted, indeed, that in three cases only had the detachment persisted as long as six months. Twelve of the cases were in myopes; four of them were instances of albuminuria (two

with pregnancy); and one was of unknown causation. Nine of the seventeen cases regained vision of 6/18 or better, and in three the vision reached 6/6. All seventeen cases, with five exceptions, were between twenty and forty years of age.

The conclusions reached by the Committee are given below in full:—

(a) Treatment by Operation

(1) Operative treatment has proved successful in cases of retinal detachment associated with myopia, traumatism, cataract extraction, and in those which, for lack of a better name, may be called idiopathic.

(2) Cure has followed operation after the detachment has lasted two years.

(3) Cure has occurred in patients as young as 15 and as old as 78, but the majority of operative cures was in patients between 20 and 40.

(4) Operation has proved successful despite the presence of vitreous degeneration, shown by vitreous opacities or haze.

(5) Successful reposition has followed operation in one or two cases where the detachment had been described as complete, but in none of the successful operation cases is there any note of the presence of retinal ruptures or holes.

(6) The operation which has proved most beneficial is some form of scleral puncture either with Graefe knife or cautery. Comparative examination of the cases shows that the addition of intra-vitreous injections has not increased the benefits derived so far as visual acuity is concerned.

(7) Full restoration of function, both central and peripheral, may be secured as the result of operation. In the majority of cases useful vision, 6/18 or better, has been gained. On the other hand, complete reposition of the retina may take place with very slight, or even no, restoration of vision.

(b) Spontaneous Cures

(1) Spontaneous cures have occurred in cases of myopia, traumatism, albuminuria of pregnancy, and in idiopathic cases.

(2) It has resulted after the detachment has lasted three and a half years.

(3) It has occurred in a case *æt.* 9 years, and one *æt.* 63 years. Half the cases of spontaneous cures in this series were over 40.

(4) The statements 4, 5, and 7, made about operation cases apply also to spontaneous cures, with this exception—that cases of spontaneous cure are recorded where tears in the retina have been noted.

(c) Non-operative Treatment

(1) The Committee find some difficulty in arriving at definite conclusions as to the part played by non-operative treatment in the cure of detachment. The two means which seem to have proved most efficacious are rest in bed and the use of pressure bandages.

(2) Cases of detachment in association with albuminuria have recovered in which the only treatment employed was rest in bed.

S. S.

IV.—EXOPHTHALMOS.

(1) **Denhaene (Brussels).—A case of voluntary exophthalmos (Un cas d'exophtalmie à volonté.)** *Soc. belge d'Ophtal.*, 28 avril, 1912.

(2) **Barrière, A. Vasquez (Montevideo). — Voluntary exophthalmos in a case of dermoid cyst of the orbit (Willkürlicher Exophthalmus in einem Fall von Dermoidzyste der Orbita.)** *Klin. Monatsbl. f. Augenheilk.*, March, 1913.

(3) **Mathewson, Geo. H. (Montreal).—A case of pulsating exophthalmos** *Ophthal. Rec.*, June and September, 1913.

(4) **Maher, W. Odillo (Sydney).—Notes on unusual cases of pulsating exophthalmos** *Ophthal. Rev.*, April, 1914.

(5) **Maher, W. O. (Sydney).—Notes on two unusual cases of pulsating exophthalmos** *Ophthalmology*, April, 1914.

(6) **Ramsay, A. Maitland (Glasgow).—The clinical significance of exophthalmos** *Medical Press and Circular*, June 17th, 1914.

(7) **Sym, William George and Miles, Alexander (Edinburgh).—A case of intracranial traumatic arterio-venous aneurysm affecting both eyes** *Edin. Med. Jl.*, November, 1914.

(8) **Kuhnt, H. (Bonn).—Mucocele of the frontal sinus and of the ethmoidal cells, with sudden high-grade exophthalmos (Mukokele der Stirnhöhle und des Siebbeinlabyrinths mit plötzlichem hochgradigen Exophthalmus.)** *Zeitschr. für Augenheilk.*, January-February, 1915.

(9) **Bedell, Arthur J. (Albany).—Traumatic pulsating exophthalmos, with complete bibliography** *Arch. of Ophthal.*, Vol. XLIV, No. 2, March, 1915.

(10) **Snowball, Thos. (Burnley).—Spontaneous pulsating exophthalmos in a boy** *Trans. Ophthal. Society U.K.*, Vol. XXXV (1915), p. 169.

(11) **Fisher, J. Herbert (London).—Case of aneurysm of the cavernous sinus** *Proc. Royal Soc. of Med.: Section of Ophthal.*, March, 1916.

(12) **Burns, J. Crawford.—Reports and commentaries on five surgical cases** *Edin. Med. Jl.*, September, 1916.

(13) **Cross, F. R. (Bristol).—Symmetrical proptosis of both eyes. query lymphoma** *Trans. Ophthal. Society U.K.*, Vol. XXXVI (1916), p. 253.

(14) **Greig, David M. (Dundee).—A case of idiopathic dislocation of the eyeball** *Edin. Med. Jl.*, February, 1917.

(1) **Denhaene** narrates the case of a man, 22 years of age, who, as the result of an injury to the lower and outer part of the orbit, developed marked exophthalmos which he could produce by compression of air in the nose. The exophthalmos measured 20 mm. to 30 mm. The author thinks that the condition can be explained by a varicose intraorbital tumour or a venous angioma.

MARCEL DANIS.

(2) **Barrière** describes the case of a young man, 19 years of age, with right-sided exophthalmos, said to date from infancy. He complained that the exophthalmos was increasing in degree, and that every time he chewed the protrusion increased and diplopia occurred. Movement of the eye outwards was slighly limited; the exophthalmos, which amounted to 5 mm., could be reduced by pressure; and no tumour could be felt. When he pressed the jaws firmly together, the eye protruded 2·5 mm. further and turned slightly inwards, diplopia came on (homonymous, in the right half of the field), there was a protrusion of the outer half of the lower lid, and a smooth elastic tumour could be felt in the lower and outer part of the orbit. Relaxation of the muscles of mastication caused the disappearance of these phenomena. By puncturing the tumour fluid was removed from it, and the increased exophthalmos, etc., could not be produced until the tumour had refilled.

The clinical diagnosis was dermoid cyst of the orbit extending through the inferior orbital fissure into the temporal fossa, and this was confirmed when the tumour was removed by Krönlein's method.

A. J. BALLANTYNE.

(3) **Mathewson** records a case of pulsating exophthalmos following fracture of the base of the skull. A month after the accident, there was much proptosis, and marked restriction of movements of the globe, but no pulsation. Although the optic disc and fundus were normal, vision was reduced to counting fingers at 8 feet in the upper half of the field, while it was entirely lost in the lower half. Six weeks later, dilatation of the palpebral veins and pulsation of the eyeball appeared, while the optic nerve showed slight pallor and the retinal veins some dilatation. During the succeeding eight months, an audible ***bruit*** developed, proptosis

became more marked, and vision was further reduced. The common carotid was tied with good results, there being but little proptosis and no pulsation or *bruit* a month after the operation.

J. JAMESON EVANS.

(5) The first of the two patients reported by **Maher** received a blow on the head, the site of injury not being stated. Symptoms of pulsating exophthalmos set in on the right side in three weeks. Four months later the right eye was removed, and after a few weeks, pulsating exophthalmos developed on the *left* side. The symptoms of this were completely controlled by pressure on the *right* common carotid, and cure was obtained by ligature of the *right* internal carotid.

In the second case the base of the skull was fractured by a fall from a height. Left exophthalmos appeared six weeks later. After a few weeks this began to subside, but as this went on pulsating exophthalmos gradually developed on the *right* side. This could be controlled by pressure on the *left* common carotid, and the symptoms were much relieved by ligature of the *left* internal carotid.

The unusual feature of these two cases was the control of the pulsating exophthalmos by pressure on the opposite common carotid. A. J. BALLANTYNE.

(6) In an interesting clinical lecture, **Maitland Ramsay** presents in compact form the principal facts regarding exophthalmos as a clinical symptom.

Under the heading of exophthalmos, accompanied by signs of inflammation, abscess of the orbit is described, and special detailed reference is made to the possibility of cavernous sinus thrombosis as a complication, to its signs and symptoms, and to its prognostic significance. The author then discusses the chief possibilities where the exophthalmos is not accompanied by signs of inflammation. In this connection he draws attention to the fact that while bilateral exophthalmos of this type is, as a rule, symptomatic of general disease, there are many exceptions to the rule. In Graves's disease the exophthalmos may be unilateral, a fact familiar to most of us. In this disease the disfigurement may be lessened by tarsorrhaphy, an operation which has the additional advantage of protecting the exposed cornea and preventing ulceration.

ERNEST THOMSON.

(7) The main facts of the case of **Sym** and **Miles**, are as follows.—A man, aged 46 years, sustained a fracture of the middle fossa of the base of the skull in a carriage accident. On regaining consciousness, he was troubled with a buzzing noise in both ears. Somewhat later, right ptosis and inability to move the right eye either to the right or left. Within ten days of the accident, the right eye became protruded and reddened, and its sight began to fail. The congestion of the conjunctiva became extreme, and some

oozing of blood took place. After an unsuccessful attempt to control the bleeding by ligation of the bleeding points, another surgeon enucleated the eye. Eight weeks after the injury, the left eye showed signs of involvement. Seventy-eight days after the original injury, the right common carotid artery was tied with excellent result (V. 6/6). The patient was discharged on the twenty-first day after operation, and when heard of several months later, had resumed his work as a farmer. S. S.

(8) **Kuhnt** describes a case of mucocele of unusual character which occurred in his practice some years ago, before Röntgen photography had advanced sufficiently to enable pictures of the skull to be taken. In consequence, the condition was mistaken for a new growth, and was attacked from the temporal side by Krönlein's method. The discovery of the true nature of the swelling was followed up by a radical frontal sinus operation. A mucocele almost always follows a trauma, and develops slowly, generally in the frontal sinus or in the ethmoid cells. In Kuhnt's case there had been a blow upon the temple, and the mucocele appeared suddenly and reached its full size within a couple of days. The accident had occurred two years before the patient developed exophthalmos.

T. H. BUTLER.

(9) **Bedell** publishes a case of pulsating exophthalmos, and deals with the literature of the subject. To the 214 already previously discussed, he adds 32 others, thus bringing the total under review up to 246.

He discusses the treatment of the condition. Ligation of the common carotid artery is the operation most often resorted to; but as it has frequently been attended with fatal results, he thinks ligation of the superior ophthalmic vein should receive greater attention in future. This is, in his opinion, an operation which should always be done after ligation of one common carotid has failed; in many cases it may be advised as the primary procedure. He does not recommend the injection of gelatin, compression of the carotid, nor treatment by drugs, rest, etc. R. H. ELLIOT.

(10) **Snowball** carefully reports a case of spontaneous pulsating exophthalmos in the right eye of a lad, 13 years of age. The condition was treated by ligature of the right common carotid artery and external jugular and common facial veins. Ligatures were also applied to engorged veins over the inner and outer end of the upper edge of the orbit. The patient died suddenly on the morning of the ninth day after operation, at a time when all appeared to be going well. The post-mortem examination was most instructive.—A considerable clot of blood was found to lie over the left parietal region and in the left middle fossa of the base of the skull. A clot of blood was found to protrude from a cavity in the apex of the left temporo-sphenoidal lobe, and the brain substance around showed

signs of softening. The right internal carotid showed an aneurismal dilatation, the upper part of which communicated by a small aperture with the cavernous sinus. The last-named was distended and distorted, and contained a dark-red blood clot, streaked with white fibrin. S. S.

(11) **Fisher's** case, which occurred in a woman aged 59 years, may very well have been an instance of spontaneous communication between the internal carotid artery and the cavernous sinus.

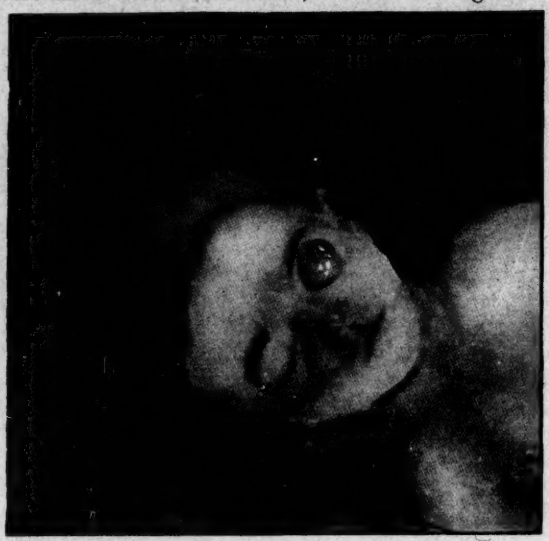
The patient suddenly felt giddy, and fell down some six steps. She remained unconscious for four or five hours, and vomited on recovering her senses, and was sick occasionally during the next two or three days. There was no clear evidence of fractured base, no bleeding from the nose or mouth, and no blood found in the vomit. On the third day after the fall, the woman's right eye became prominent. Seen by Fisher, seven weeks later, there was marked pulsation of the right eyeball, and a thrill was felt. A loud *bruit* was audible over the eyeball and the right fronto-temporal region. There was paralysis of all extrinsic muscles of the eye except the superior oblique. The pupil did not react to light. V. (corrected) = 6/24 partly. The patient was kept at rest in bed, and ten grain doses of potassium iodide were administered. After fifty-six days, the sight of the affected eye (corrected) = 6/9. There was some evidence that the dilating fibres of the right iris were paretic, and this was supposed by Fisher to be due to implication of the sympathetic nerve filaments in the cavernous sinus. S. S.

(12) Among these five surgical cases from the Edinburgh Royal Infirmary, **Burns** describes one of dermoid cyst in the orbit of a girl, twelve years of age, following an injury to the head, six years before. One eye was displaced forwards and outwards, and the movements of the eyeball were somewhat limited. There was a marked fulness over the corresponding part of the temple. Diplopia. Vision almost normal. Slight fulness of the retinal veins, suggestive of difficulty in return of blood. The X-ray examination showed a tumour involving an area of the orbit, temporal fossa, and cranial fossa on the right side of the skull. The edge of the tumour was dense, and the centre clear. After potassium iodide had been tried without success, the tumour was removed, and recovery was uneventful. S. S.

(13) A man, aged 53 years, had suffered from protrusion of the eyes, without known cause, for some two months before he was seen by **Cross**. On examination, there was redness of the conjunctiva of both eyes with symmetrical swelling of the eyelids and orbital tissues, causing proptosis of the eyeballs. The optic discs were normal, and there was no evidence of pressure upon the retinal blood-vessels. Movements of the eyeballs were not impaired in any direction. Despite various forms of treatment, the

condition did not improve. Examination of the nasal sinuses was negative. Leucocythæmia and chloroma were excluded by examination of the blood. There was no enlargement of lymphatic glands, liver, or spleen. A small ulcer developed in each cornea, probably as the result of exposure. No clue was obtained as to the actual pathological cause of the proptosis, which must accordingly be left an open question. We may venture to express a hope that more will be heard of this interesting case. S. S.

(14) The curious case reported by **Greig** was observed in a marasmic child, aged eleven months, and weighing only seven pounds. She screamed incessantly, and it was noticed that when crying, all the voluntary muscles (including the orbicularis palpebrarum on both sides) were thrown into a state of convulsive movement, while, in addition, the eyeballs were protruded to such an extent that extrusion appeared to be imminent. If the fit of crying were more violent than usual, or with the slightest touch on



the outer canthus, the left eyeball was protruded with a jerk from between the lids. The globe could not be voluntarily retracted, but was quite easy to replace with a little pressure. It is to be particularly noted that the cranial vault was of normal size and contour, that there was no appearance of hydrocephalus, and that the orbits (as far as could be made out) were of normal size and depth. During sleep the eyeballs showed no projection. The globes were not unduly large. S. S.

V.—HERPES CONSECUTIVE TO ANTI-TYPHOID INOCULATION

(1) **Morax, V. (Paris).—Herpes of the mucous membranes and of the cornea following anti-typhoid vaccination (Herpes des muqueuses et de la cornée consécutif à la vaccination anti-typhique.)** *Ann. d'Ocul.*, mai, 1916.

(2) **Morax, V. (Paris).—A new case of palpebro-ocular herpes, consecutive to anti-typhoid vaccination (Nouvelle observation d'herpes palpébral oculaire consécutif à la vaccination anti-typhique.)** *Ann. d'Ocul.*, novembre, 1916.

(3) **Gloagen (Cherbourg).—Three cases of palpebro-ocular herpes following anti-typhoid vaccination (Trois observations d'herpes palpébro-oculaire consécutif à la vaccination anti-typhique.)** *Ann. d'Ocul.*, janvier, 1917.

(1) **Morax** records the case of a soldier, aged 43 years, who developed herpes of the cornea after anti-typhoid inoculation.

The first injection, on February 15th, 1916, caused neither *malaise* nor elevation of temperature. The second injection, on February 22nd, caused slight fever and disturbance at night, and was followed in two days by a slight eruption of herpes on the lower lip. The third injection, on February 29th at 9.30 a.m., was followed in half an hour by *malaise*, severe enough to make the patient go to bed. Towards midday he had rigors, and his temperature rose to 40° C. Next day he was much better, and his temperature 38° C. On March 2nd he had an attack of herpes on the lips and the right nostril, and behind the right ear. On March 4th his right eye became irritable, and his eyelids a little swollen. When seen by the author on March 7th, he had typical herpetic keratitis in the right eye. Under treatment, this cleared up, and on April 1st the area which stained with fluorescein was reduced to the size of a pin-head. The man had never previously suffered from herpes, and the repetition of the series, inoculation fever, incubation stage of two or three days, and herpes, seems to prove that the inoculation was the cause of the eruption.

The author also refers to the following three cases of ocular lesions following anti-typhoid inoculation, which he regards as coincidences.—(1) Paramacular retinal hæmorrhage; (2) paralysis of both recti externi, associated with generalised paralysis; and (3) failure of sight due to optic neuritis caused by intracranial neoplasm.

These four cases only were observed among 1,700 inoculated soldiers whom he examined. He publishes them because he considers that all lesions which may occur after anti-typhoid inoculation, and which can be regarded as due to it, should be recorded, with a view to discovering by clinical analysis, and, above

all, by collation of the reports of different observers, which are really caused by the vaccination and which are merely coincidences.

R. J. COULTER.

(2) **Morax** also records another case of herpes, consecutive to anti-typhoid inoculation. Four such injections were made, and the first three were followed by no untoward complications. The fourth, however, was quickly succeeded by violent reaction, during which the temperature rose to 40·5° C. Two days after the injection, there was an eruption of facial herpes, and the man noticed that the sight of his better eye had become cloudy. When seen by the author, some three weeks after the injection, there were signs of the recent eruption upon the face and the eyelids. The patient's right eye was somewhat reddened and sensitive to light, and facettes, in a circinate arrangement, were present in the lower half of the cornea. V.=2/10. S. S.

(3) **Gloagen** reports three cases where anti-typhoid vaccination was followed by general symptoms, as fever, headache, and dorso-lumbar pain, along with cutaneous and ocular herpes. The corneal herpes was observed after the first injection in one case; after two injections in a second; and after the fourth injection in the third case. In each instance remaining corneal opacities reduced V. to 0.1, 0.2, and 0.6 respectively. S. S.

VI.—ROYAL COMMISSION ON VENEREAL DISEASES

(1) **First Report of the Commissioners (Cd. 7474), 1914.** Price ½d.

(2) **Appendix to First Report of the Commissioners (Cd. 7475), 1914.** Price 3s. 8d.

(3) **Final Report of the Commissioners (Cd. 8189), 1916.** Price 1s. 11d.

(4) **Appendix to Final Report of the Commissioners (Cd. 8190), 1916.** Price 3s. 9d.

The minutes of evidence (2 and 4) given before the Royal Commission on Venereal Diseases (appointed in 1913), included evidence by several ophthalmic surgeons, amongst whom may be mentioned Mr. F. R. Cross, Mr. W. H. H. Jessop, Mr. N. Bishop Harman, and Mr. E. Treacher Collins. Interesting points were made by all the witnesses named.

Mr. F. R. Cross considered that interstitial keratitis was "practically always due to congenital syphilis." . . . Asked whether any attempt was made at Bristol to explain to the parents of those affected with the disease the necessity of personal treatment, Mr. Cross replied in the negative. He entered a plea for the State

provision of facilities for the diagnosis and treatment of syphilis. He thought that in children gonorrhœa was the chief cause of blindness, while in adults, on the other hand, syphilis was more to blame. He spoke highly of the curative effect of salvarsan in specific diseases of the eye. He saw no objection to the use of silver nitrate to the eyes of newly-born infants, although he did not regard it as a necessary routine method for the prevention of ophthalmia. Unlike Mr. N. Bishop Harman, he knew of no instance of ophthalmia neonatorum transmitted from an affected baby to other children of the same family.

Mr. W. H. H. Jessop's evidence as regards syphilitic affections of the eye was of an interesting and exact nature.

Of 31 cases of iritis, 45·16 per cent. yielded a positive Wassermann reaction, and no particular difference was noted as between men and women. In 24 cases of choroiditis, the percentage of positive reactions was 29.16. (Mr. Harman, however, believed that the figure in question would be higher still if children were included in the returns.) In 62 cases of interstitial keratitis, the Wassermann was positive in 51·61 per cent. Most of the remaining cases were due, in Mr. Jessop's opinion, to tubercle. Of 20 cases of primary optic atrophy, 35 per cent. gave a positive reaction. As regards the treatment of gonorrhœal iritis, the witness had had no success from the employment of gonococcal vaccine. Mr. Jessop advocated the institution in every general hospital of a special department for the diagnosis and treatment of venereal diseases, a conclusion concurred in by Messrs. Collins and Harman. He had the greatest belief in the value of education in reducing the prevalence of venereal disorders, and threw out the suggestion that under the improved conditions thereby brought about, every syphilitic patient might be induced to keep a small book containing a record of his case and its treatment. The witness's experience of salvarsan in the treatment of optic atrophy had not been of an encouraging nature: he treated such cases with mercury. Iritis, however, speedily yielded to the remedy, a view in which Messrs. Collins and Harman concurred.

Mr. E. Treacher Collins gave it as his opinion that a child who showed notched teeth and other symptoms of syphilis, together with a positive Wassermann reaction, if treated with salvarsan, would be unlikely to develop interstitial keratitis at a later period of life. Mr. Jessop also thought that the disease might be prevented by very early treatment of the child or by pre-natal treatment of the mother. While agreeing generally, Mr. Harman remarked that treatment should be commenced early—that is, without waiting for any of the clinical signs.

As to the Blind, Mr. Collins suggested that the Royal Commission

might obtain statistics from all Institutions for the Blind. Questioned as to in-patient provision in the metropolis for babies with ophthalmia, he stated that three beds were available at the London Hospital and two at Moorfields. He spoke of the Liverpool experience, and stated that in Glasgow the work was being undertaken by the municipality. In regard to London, he advised that the whole matter be handed over to the Metropolitan Asylums Board, the necessary powers being given for that purpose.

Dealing with so-called "rheumatic iritis," Mr. Collins stated that he regarded most cases as being in the nature of iritis, associated with gonorrhœal arthritis. He expressed himself as sceptical as to whether iritis could be produced without the intervention of arthritis.

The vexed question of the transmission of syphilis to the third generation was touched upon by the last witness. His remarks were based upon the examination of the offspring of twelve women, themselves affected with interstitial keratitis. Of sixty children in the third generation, 23 (or 38·2 per cent.) were still-born or died in early childhood. On the other hand, Mr. Harman had found it exceedingly difficult to arrive at definite conclusions, inasmuch as the possibility of re-infection in the second generation could not be eliminated. This fallacy, indeed, rendered it impossible to place much reliance upon the figures brought forward.

As regards the value of notification in ophthalmia neonatorum, opinions differed. Thus, Mr. Cross thought that it had already accomplished something, and was optimistic enough to express his belief that ophthalmia neonatorum would be stamped out now that the disease had been made notifiable. Mr. Collins did not believe that the number of official notifications in London really represented the extent of the malady, probably because the fee did not make it worth while. Mr. Jessop, while approving notification, did not think it had helped much to reduce the number of cases. Mr. Harman was of opinion that notification served two useful purposes: first, it made medical men and midwives more careful; and, second, it rendered speedy treatment of the cases much more likely to be secured.

Sir Arthur Newsholme, K.C.B., Medical Officer to the Local Government Board, stated that the notification of ophthalmia neonatorum had applied to the entire population since April, 1914, when an order was issued by the Local Government Board making the disease notifiable throughout the whole of England and Wales. Prior to that date, the order was permissive, and applied to 35·6 per cent. of the total population. He did not believe that the statistics of ophthalmia from different districts were trustworthy for purposes of comparison, since there was more notification in some districts than in others. Notification was more common in births attended

by midwives than in births attended by medical men. The difference he traced not to an increased number of cases in the former as compared with the latter, but to the fact that no fee for notification was paid to medical men. He laid it down as a principle that "the advisability of notification in any disease is conditioned on its associated circumstances." In other words, the value of notification is only a question of balancing advantages. It had been more effective in some diseases, as typhus and typhoid, than in others, as measles and whooping cough.

Miss Alice Gregory, Honorary Secretary of the Home for Mothers and Babies at Woolwich, speaking of notification by midwives, stated that since it had been in force, there were many fewer cases of ophthalmia neonatorum. She believed that the amount of blindness due to that disease was less now than it was, and she attributed that fortunate circumstance to the greater attention now being paid to the malady.

Dr. A. K. Chalmers, Medical Officer of Health for Glasgow, gave some interesting evidence as to ophthalmia neonatorum, which was made notifiable in Glasgow in the year 1911. It was found before long that there was a certain family predisposition to the disease, which naturally suggested to the authorities the advisability of treating the mothers for the underlying complaint. As time went on, it was also discovered that the worst results occurred in cases where the disease was complicated with congenital syphilis. Thus, 98 per cent. of the non-gonococcal and 87 per cent. of the gonococcal cases were cured of the ophthalmia, while of 63 cases where syphilis complicated the ophthalmia, only 42 per cent. were cured.*

Miss Frances Ivens, the incumbent of several hospital appointments in Liverpool, gave evidence, among other things, of the method of dealing with cases of ophthalmia neonatorum at St. Paul's Eye Hospital, where both mother and child were received as in-patients.

Mention has already been made of **Mr. N. Bishop Harman's** figures dealing with blind children, and an attempt may be made to give the reader some idea of them.

* From a memorandum issued by Dr. Chalmers (March 26th, 1917), we learn that hospital accommodation was provided for certain cases of ophthalmia neonatorum in one of the Reception Houses in February, 1912. The practice grew up of admitting the mothers with the babies, in order that the former might also undergo treatment. The latest figures as to ophthalmia neonatorum are that in 1913 of a total of 467 cases where the ophthalmia was non-gonococcal, 0·4 per cent. became totally blind; of 173 cases of gonococcal ophthalmia, 0·6 per cent. became blind; and of 63 cases where ophthalmia neonatorum concurred with congenital syphilis, 9·5 per cent. were blinded. In 1914. of 328 cases, treated presumably in the Reception House set aside for the purpose, no baby was rendered totally blind by the disease, and in 1915, of 389 cases one baby alone was totally blinded.—EDITOR.

Of the 1,100 blind and partially blind children examined by Mr. Harman, the condition was due to injury or destruction of the cornea in 351 (or 31.9 per cent.), and of that number, 266 were caused by ophthalmia neonatorum, 47 by purulent ophthalmia at a later age, and 38 by phlyctenular disease. Mr. Harman claimed (and we think rightly) that there was strong presumptive evidence that the 266 cases of ophthalmia neonatorum were of venereal origin. In the retrospective diagnosis of that affection he attached very considerable importance to the existence of nystagmus. In this connection the value of scarring of the palpebral conjunctiva might perhaps also have been mentioned.

Of the 1,100 blind and partially blind children brought into the enquiry, in 222 the disability was caused by lesions of the posterior part of the eye, and of these the greater number were due to choroiditis. Of the 222 cases, 126 (or 56·7 per cent.) were syphilitic clinically, and had it been feasible to estimate the serum reaction, the proportion might have been found to be somewhat higher. Many of the cases were associated with gross mental defect. As to interstitial syphilitic keratitis as the cause of blindness in the London Blind Schools, Mr. Harman found 190 (or 0·85 per cent.). A list of the confirmatory signs of syphilis in these cases is given, and it may be noted that in no fewer than 129 "Hutchinson's" teeth were found, although that total, it should be added, included a few "Moon's" teeth. Amongst other confirmatory signs, a "characteristic physiognomy," "iritis," and "bad family history" bulked largely. Deafness, on the other hand, was present in 43 cases only.

In the examination of the sight returns of 412,527 children, the percentage of damage from ophthalmia neonatorum was 0·0106. In regard to the prevention of that disease, several years ago (1907) Mr. Harman had obtained returns from eight private medical men in an average London suburb. Of 12,680 live births, 110 (or 0·87 per cent.) were affected with ophthalmia, and damage to sight occurred in 6 (or 0·047).

As to venereal disease affecting the eyes of children attending hospital, Mr. Harman cited those he had obtained from two institutions, namely, the West London Hospital and the Belgrave Hospital for Children. The number of children examined at the two institutions was 1,188 and 1,670 respectively. Among the former, three children affected with congenital syphilis were found, and two affected with ophthalmia neonatorum, while among the latter, the corresponding figures were one and six.

Finally, Mr. Harman considered that the following conclusions might be drawn from the figures he adduced:

1. Venereal disease affecting the parents is responsible for more than one-half of all cases of blindness occurring amongst children.

2. The total of the blindness due to venereal disease does not

appear great in relation to the total population. The effects of the disease are largely masked by the heavy incidence of miscarriages, still-births, and infant deaths among the affected population.

3. The effective treatment of affected parents would result in an appreciable reduction in the cases of blindness amongst children and the disabilities arising therefrom. S. S.

BOOK NOTICES

The Ophthalmological Society of Egypt. *Bulletin* of 1914.

This Society was founded in 1902, and is composed for the most part of Egyptians, although several well-known Europeans such as MacCallan, Meyerhof, Osborne, Jacovides, Peretz, Waddy, and Sachs figure as members and contributors.

The 1914 *Bulletin* is written mainly in French and contains a paper by Meyerhof on a case of successful extraction of a piece of steel, of 150 mg. weight, with the aid of a small magnet. The immediate vision obtained was 5/10, but, unfortunately, detachment of the retina followed and vision was reduced to finger-counting at 3 metres.

The second paper was also by Meyerhof, discussing the question of a natural or acquired immunity to trachoma. He gives illustrative cases and decides the question in the negative.

MacCallan then furnished the statistics of the Egyptian travelling hospitals, which show that 40,670 new patients were treated and 30,648 operations performed.

The next paper was by Zaki Seddik, on removal of the tarsus in the treatment of trichiasis. He tried this, as he found that the cutaneous scar left by other operations was objected to by a certain number of patients, and claims to have obtained very successful results. He stated that the operation was only suitable when the tarsal conjunctiva is in a cicatricial condition, and that it sometimes renders the border of the lid rather thick. Gamal Eddin followed with a paper on the same operation. He stated that the most important complication is lagophthalmos. This is best treated by massage and bandaging the lids at night. Entropion may occur if the incision in the cartilage near the edge of the lid is irregular, leaving a thin piece at the centre and large pieces at the angles, and when the sutures are put high above the roots of the lashes. In the subsequent discussion MacCallan pointed out that the operation should not be performed unless the fornix is already

cicatrized, but when it is found necessary to remove a great deal of the conjunctiva, and it is impossible to bring down the conjunctiva to the lid margin, it is quite feasible to insert a piece of mucous membrane taken from the lip in order to increase the mucous surface and to prevent lagophthalmos or symblepharon.

Osborne then read notes of a case of papillary stasis in a man of 18 years of age, in whom no cause was found for the condition. Lumbar puncture showed great pressure and 30 c.c. of fluid was removed. The papillœdema had completely subsided a fortnight later and vision was normal.

The same author also read notes of two cases of eye injuries following electric traumatism. The first developed double optic atrophy after the passage of a current of about 450 volts through defective insulation of a tram cable. The second case suffered from the bursting of a voltaic arc close to the face. The eyebrows and lashes were burnt off and there was a greyish horizontal line on the cornea corresponding to the palpebral fissure. Twenty-four hours later this had completely disappeared and the patient was able to return to work.

The next paper was by Waddy on acquired juvenile cataract in connection with anæmia, ankylostomiasis, and pellagra. He said these cases were quite common in Egypt, and that in the last year he had met with more than fifteen. He found that they have a most favourable operative prognosis. In the subsequent discussion MacCallan also commented on the common association of anæmia with acquired juvenile cataract, and that, as the commonest cause of anæmia in Egypt was ankylostomiasis, the treatment of that disease was of great importance. He suggested that the cause of the anæmia in ankylostomiasis might be a toxin secreted by the worm.

Sobhy showed microscopic specimens of a melanotic sarcoma of the conjunctiva of the upper lid, of a glioma endophytum, a sarcoma of the lacrymal gland, and an adeno-carcinoma of the same structure.

The concluding paper was by Nasr Farid, giving his experiences of the ophthalmic diseases in the last Turkish and Macedonian wars.

E. E. H.

The Ophthalmological Society of Egypt. *Bulletin* of 1915. Printed by M. Roditi & Co.

The Egyptian Society have published the 1915 Report mainly in English, instead of in French, as in the previous number. It would be advisable, if they decide to continue to do so, that some one who is more familiar with the English language should revise the proofs, as errors in grammar and spelling are very numerous and

disfiguring. The following papers were read:—Fischer (Cairo), Ophthalmology and general Medicine; El-Rasheed (Assiout), night blindness; Oulton (Cairo), The comparative infrequency of simple iritis and irido-cyclitis cases among the Egyptian fellahin; Sadik (Tanta), Study of some cases of optic neuritis and of atrophy of the optic nerve; MacCallan, Acute conjunctivitis in Egypt; Azer Wahba (Zagazig), Fat grafting after excision of the globe; Soliman (Cairo), Gangrene of eyelids; Sobhy (Mansoura), A rare case of streptothrix infection of the conjunctiva, probably actinomycetic; Seddik (Mansoura), Late infection after sclero-corneal trephining operation; Fischer (Cairo), Rhinoscleroma with secondary growths in conjunctiva and eyelids; Sobhy (Mansoura), A case of absolute glaucoma trephined twice with failure to relieve tension; Wahba (Zagazig), Fly blown orbit; MacCallan, Statistics of blindness in Egypt during 1914.

In addition to the papers, some of which we hope to notice at greater length, several interesting cases and specimens were shown.

E. E. H.

NOTES

Deaths

A. VON HIPPEL, formerly professor of ophthalmology in the University of Göttingen, died two days after the celebration of his seventieth birthday. He was widely-known as a prolific writer.

W. Franklin Coleman, once professor of ophthalmology in the Post-Graduate Medical School of Chicago, has died at the age of seventy-nine years. He was born in Canada, and held British qualifications. He first practised in Toronto, and then in St. John, New Brunswick, Canada, and finally went to Chicago in 1885. He wrote extensively upon electricity in eye, ear, throat, and nose work. In 1912 he published a book dealing with the subject.

The death is announced of Julien Masselon, for the whole of his professional life *chef de clinique* to de Wecker. Masselon was born at Rouen, where he received his medical education. In June, 1871, he entered de Wecker's clinic. He made many contributions to ophthalmic literature, almost always in association with de Wecker. The sole exception, indeed, was his *Précis d'Ophtalmologie Chirurgicale*, published in 1886. After the death of de Wecker in 1906, Masselon retired to the country, although his master had bequeathed to him the clinic of the Rue du Cherche-Midi.

We announce the death of the well-known Sicilian ophthalmic surgeon Francesco Francaviglia, aged seventy-four years. The cause of death was cerebral hæmorrhage.

Nicolo Manfredi has died at the age of eighty years. A list of his contributions, twenty-nine in number, was published in the February number of our contemporary, *Annali di Ottalmologia e Clinica Oculistica.*

The death is announced of Professor Haltenhoff, of Geneva, at the age of 72 years.

The death of Dr. Menacho, of Barcelona, editor of the *Archivos de Oftalmologia Hispano-Americanos*, is announced.

The deaths of the following German ophthalmic surgeons are reported in the *Annali di Ottalmologia e Clinica Oculistica*:—Professor Ulrich, aged 67 years; Professor Schmidt-Rimpler, aged 77 years; Professor Birnbacher, aged 64 years; and Professor Stilling, aged 73 years.

The deaths of the following American ophthalmic surgeons are announced:—Howard Marsh, 45 years; George W. Robinson, 53 years; Frank A. Ford, 40 years; H. D. Holton, 79 years; M. R. Pritchard, 64 years; and J. L. Moffett, 63 years.

* * * *

Appointments

R. FOSTER MOORE has been appointed assistant ophthalmic surgeon to St. Bartholomew's Hospital, London.

The staff of the "Dublin Hospital," which has recently left for France, includes Captain F. C. Crawley as ophthalmologist.

It is stated by the *Annali di Ottalmologia e Clinica Oculistica*, that Professor Bernheimer has been appointed to succeed Professor Fuchs in charge of the Vienna Clinic.

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Ophthalmological Society of the United Kingdom

THE following Members of the Ophthalmological Society have been elected as Officers for the year 1917-1918:—

President: E. Treacher Collins. Vice-Presidents: F. Richardson Cross, A. Maitland Ramsay, Sydney Stephenson, and A. Lawson.

Treasurer: James Taylor. Council: Gordon Holmes, J. Craig, H. L. Eason, A. H. H. Sinclair, R. R. Cruise, and J. F. Cunningham. Secretaries: M. S. Mayou and S. A. K. Wilson.

* * * *

Alvarenga Prize

IT is announced that the Alvarenga Prize, which amounts to about two hundred and fifty dollars, will be awarded by the College of Physicians of Philadelphia on July 14th, 1917. Essays offered for competition may be on any subject in medicine; must be typewritten; and if in a language other than English, should be accompanied by an English translation. Apply to Francis R. Packard, 19, South 22nd Street, Philadelphia, Pa., U.S.A.

* * * *

American Board for Ophthalmic Examinations

THE American Board for Ophthalmic Examinations, one of the chief duties of which is the examination and certification of those who desire to practise ophthalmology, announces that its second examination will be held in New York City on June 7th, 8th, and 9th. The first was held in Memphis in December, 1916, when twelve candidates presented themselves. The Board, it may be remembered, was organized in 1916, and consists of representatives from the American Ophthalmological Society, the Section of Ophthalmology of the American Medical Association, and the American Academy of Ophthalmology and Oto-Laryngology. It includes nine members, three from each of the bodies named. The term of office is limited to six years. It may be noted that the American Ophthalmological Society and the American Academy of Ophthalmology and Oto-Laryngology have decided that after *1920 every applicant for membership shall be required to possess the* certificate of the Board, unless he has a degree in ophthalmology *conferred by a recognized university.*

* * * *

Amalgamation of ophthalmic journals

WE learn that a circular letter, dated April 25th, 1917, has been sent to each American ophthalmologist, in an effort to secure co-operation in the movement to combine several of the ophthalmic journals at present published in the United States. It alludes, among other things, to our own and to Italian efforts in the desired direction, as well as to the combination that

has been suggested, but not yet carried out, in France. The proposed journal will be conducted and controlled by "a stock company," composed of ophthalmologists, and all surplus income over a low interest on the capital invested, will be applied to the improvement of the journal, "and in doing other things that will benefit its subscribers." The letter is signed by the following:—

Frank Allport, Albert E. Bulson, Peter A. Callan, W. L. Dayton, E. C. Ellett, Harold Gifford, Lucien Howe, Edward Jackson, Arnold Knapp, Walter R. Parker, William Campbell Posey, J. M. Ray, Samuel D. Risley, Robert Sattler, G. C. Savage, G. E. de Schweinitz, Eugene Smith, Myles Standish, George F. Suker, Lewis H. Taylor, Frank C. Todd, D. T. Vail, John E. Weeks, Joseph A. White, Meyer Wiener, William H. Wilder, Casey A. Wood, Hiram Woods, William Zentmayer.

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Ophthalmic Review Index

THE editors and readers of the *Ophthalmic Review* are greatly indebted to R. Rutson James and David Priestley Smith for the preparation of the Index for Vols. XXII to XXXV, published by Sherratt & Hughes, of Manchester, at the price of 2s. 6d. A similar task was undertaken by E. Treacher Collins for Vols. I to VII, and by W. G. Sym for Vols. VIII to XXI. Thus the task of referring to any article in the *Ophthalmic Review* is rendered comparatively easy.

FUTURE ARRANGEMENTS

	1917	
Midland Ophthalmological Society	June 5th.	The Eye Hospital, Oxford.
Section of Ophthalmology, Royal Society of Medicine	June 13th.	1, Wimpole Street, London, W.
Oxford Ophthalmological Congress	July 12th and 13th.	Keble College, Oxford.